



ISSN 0971-0167



मत्स्य प्रौद्योगिकी समाचार Fish Technology Newsletter

Vol. XXIV / No. 1, January - March 2013



Contents

News from the Research Front	1
Publications	10
Training Programmes	11
Exhibitions	12
Outreach Programmes	14
Workshops and Seminars	15
Consultancies	28
Awards and Recognitions	34
Celebrations	35
Post Graduate Studies	35
Personnel News	37
Personalia	40

Editorial Committee

Dr. P.T. Lakshmanan, HOD, B&N	: Chairman
Dr. Leela Edwin, HOD, FT	: Member
Dr. K.V. Lalitha, HOD, MFB	: Member
Dr. T.V. Sankar, HOD, OAM	: Member
Dr. S. Balasubramaniam, HOD, EIS	: Member
Dr. C.N. Ravishankar, HOD, FP & HOD I/C, Engg.	: Member
Dr. A.R.S. Menon, Technical Officer (T9)	: Member Secretary

News from the Research Front

Solar Drying Using CIFT Solar Fish Dryer: An Eco-friendly and Hygienic Way of Fish Drying

Open sun drying, a cost effective preservation process has been used since time immemorial to dry various fishery as well as agricultural products as a means of preservation. To overcome the disadvantage of open sun drying, such as high labour costs, large area requirement, inability to control the drying process, possible degradation due to biochemical or microbiological reactions, insect infestation etc., a solar dryer with alternate electrical backup was designed and developed for drying fishes and other fish products hygienically in hot and humid climatic conditions. The dryer is made of food grade stainless steel and consists of a drying chamber and solar heat collecting panels. The experimental trials on solar drying were conducted with prawns using food grade stainless steel (SS 304) trays under controlled climatic conditions. The moisture content of prawn is reduced to 13-15% within a time span of 8 hours in place of 48



Solar dryer with electrical backup developed by CIFT, Cochin.

केन्द्रीय मत्स्यकी पौद्योगिकी संस्थान

सिफ्ट जंक्शन, मत्स्यपुरी पी. ओ., कोचिन

Central Institute of Fisheries Technology

CIFT Junction, Matsyapuri P.O., Cochin - 682 029



hours in the case of open sun drying. The colour and texture of the dried prawns showed better quality as compared to open sun drying.

Due to lack of infrastructure for storage of raw fish and efficient transport system to different destinations, huge quantity of fish is not properly treated resulting in significant loss. Moreover due to the lack of appropriate facilities to handle the low value fish on land, it is understood that more than 10% of the total landings valued at about ₹600 crores worth is thrown back into the sea by fishermen prior to landing. Out of total marine production nearly 20% are dried and sold as dried food in the market during the offseason. Fish is a highly perishable food material and can be preserved by refrigeration or by drying. Since most of the fishermen living at the coastal belt of India are below poverty line, the method of refrigeration is a distant dream to them. The only alternative available is 'Drying' which is the simplest and widely accepted technique for food preservation. Simple sun drying is the oldest method of seafood preservation and works well with small types of fishes. But sun drying is not effective in case of medium and large sized fishes like mackerel, seer, shark, ray, tuna etc. since the flesh is thick and it takes longer time to get dried up to the required level of moisture content and at the same time no control over weather. Major disadvantage of this method is the contamination of food products by dust, dirt, birds, animals and insects, spoiled products due to rain, wind and moisture and the method fully depends on good weather conditions. Further the process is labour intensive, unhygienic, unreliable, time consuming, non-uniform and requires a large area for spreading the products.

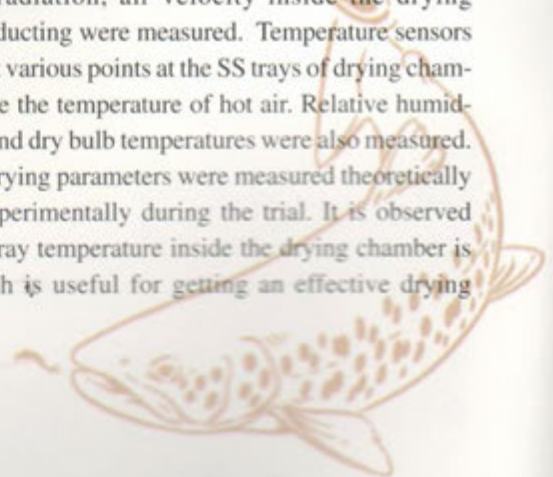
These disadvantages of open sun drying can be overcome by using closed chambers for drying which give hygienic and quality product. Closed chamber drying save space, labour and time, reduce microbial spoilage, preservation quality of fish and it is cost effective too.

Alternative energy sources are coming into sharp focus in an era of escalating fuel prices. It is against this background that solar energy is gaining attention as a potential source for drying. When the sun shines so brightly for a good part of the year in a tropical country like India tapping this energy is the best option man has for conserving conventional sources of energy.

Solar dryer with alternate energy backup is designed and developed to dry fish, fish products and other agricultural commodities under hot and humid conditions prevailing in coastal regions of India and other parts of the

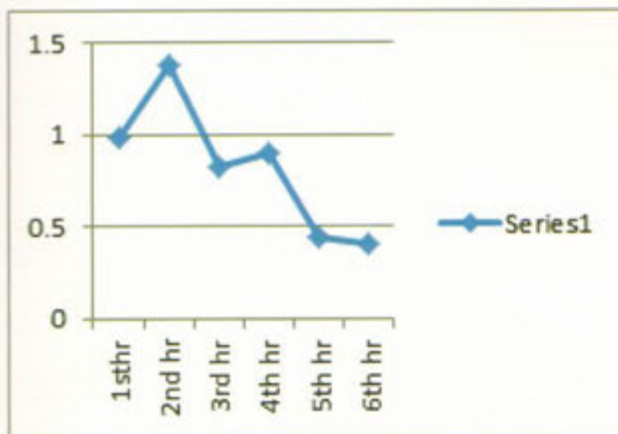
country. This dryer developed by CIFT, Cochin consists of two main parts that is solar collector and drying chamber. Collector and chamber is connected by the thermal insulated PVC ducting with minimum bends. Drying chamber consists of ten perforated/wire mesh food grade SS 304 trays with sufficient spacing for smooth flow and uniform distribution of hot air inside the drying chamber coming from solar heat collecting panels. The maximum capacity of drying chamber depends on spreading area of perforated trays and also size of the fish which is being used for drying. Dryer is insulated with proper glass wool insulation to minimize the heat loss to the ambient. The heat collecting panels are made by corrugated Aluminum sheets painted black, covered with toughened glass sheet of suitable thickness. The ambient air enters inside the solar heat collecting panels naturally in such a way that it covers the maximum area of panels for getting heated sufficiently before entering into the drying chamber. Heat collecting panels should be installed on the open ground or roof top of buildings depending on the availability of space and facing towards south direction for harnessing the maximum amount of solar heat. Inclination of the panels should be based on the latitude of the particular location. A centrifugal blower of suitable capacity is used to draw the hot air from the solar panel connected in the suction line of drying chamber. Hot air from the solar heat collecting panels is blown to the middle portion of the drying chamber from the back side by the blower. A divider is placed in the path of hot air for bifurcation of hot air stream for uniform distribution inside the top and bottom compartments. There is an alternate energy option of electricity as a backup inside the drying chamber to maintain uninterrupted drying process during night hours or rainy/cloudy days. Electrical coils are used as an alternate energy backup which is placed at the inlet of hot air. During rainy season or non-availability of proper sunshine, this alternative is used to maintain the heat inside the drying chamber.

During trials dryer takes 6-8 hours to dry fish (prawn) and moisture content at the end of drying is about 13-15%. The solar irradiation, air velocity inside the drying chamber and ducting were measured. Temperature sensors were placed at various points at the SS trays of drying chamber to measure the temperature of hot air. Relative humidity, wet bulb and dry bulb temperatures were also measured. The various drying parameters were measured theoretically as well as experimentally during the trial. It is observed that average tray temperature inside the drying chamber is 49.5 °C which is useful for getting an effective drying





condition. The temperature range required for effective drying should be 45-55 °C inside the drying chamber. The flow rate of hot air at the entrance of drying chamber should not be less than 90m/min. Overall drying rate was in decreasing order when the drying process continues. In first two hours, the drying rate was increased but from 3rd to 5th and then 6th hour the rate of drying relatively decreased, as moisture content inside the fish was high at the beginning of the process and it was continuously decreased with time. Average drying rate was found to be about 0.82g/hr. Drying rate will be different for the different fishes and



Drying rate (g/hr) Vs Time (hr)

Ankur Nagori, C.R. Gokulan, P.K. Shyma, Jose Kalathil and Dr. C.N. Ravishankar

Engineering Division, CIFT, Cochin

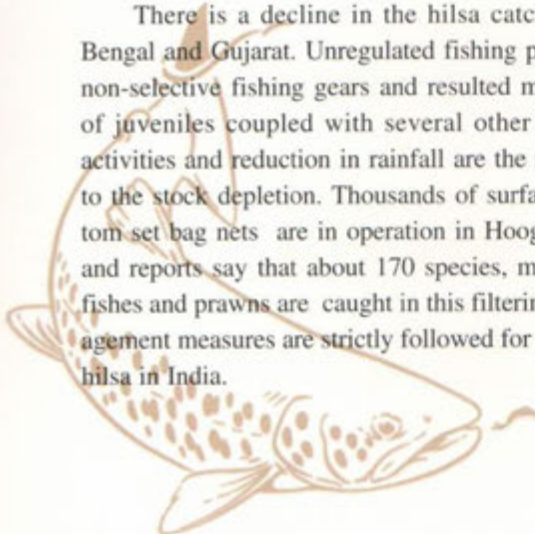
BRD to Reduce the Landings of Juveniles of Hilsa, *Tenualosa ilisha* in Stationary Bag Nets

Hilsa shad, *Tenualosa ilisha*, is one of the costliest fish in India and is caught from the sea and inland waters, mainly from Hooghly river in West Bengal and Narmada river in South Gujarat. Nylon monofilament gill net is the most popular fishing gear used for capture of hilsa along the inland waters.

There is a decline in the hilsa catches from West Bengal and Gujarat. Unregulated fishing practices, use of non-selective fishing gears and resulted mass destruction of juveniles coupled with several other anthropogenic activities and reduction in rainfall are the reasons leading to the stock depletion. Thousands of surface set and bottom set bag nets are in operation in Hooghly river alone and reports say that about 170 species, mostly juveniles, fishes and prawns are caught in this filtering net. No management measures are strictly followed for conservation of hilsa in India.

In view of the declining catches of hilsa, CIFT in collaboration with Central Inland Fisheries Research Institute (CIFRI), Barrackpore has taken up a study to reduce the capture of juveniles of hilsa and other commercially important fishes in the stationary bag nets. A Bycatch Reduction Device (BRD) consisting of a square mesh window of size 1m x 0.75m made of 50mm mesh has been fixed near the codend of bag nets to permit the escapement of juveniles. Covers with very small mesh size are fixed over and on top of the square mesh windows to retain and quantify the juveniles escaping through the window.

These experimental bag nets are under operation at Tribeni, Godakhali and Frasergunj in Hooghly river, West Bengal, Bharbhut in Narmada river in Gujarat and at Odalerevu, Godavari river in Andhra Pradesh. In Hooghly the mean escapement of all the species from the BRD was found to be 0.65 kg and juveniles of hilsa formed 11.60%

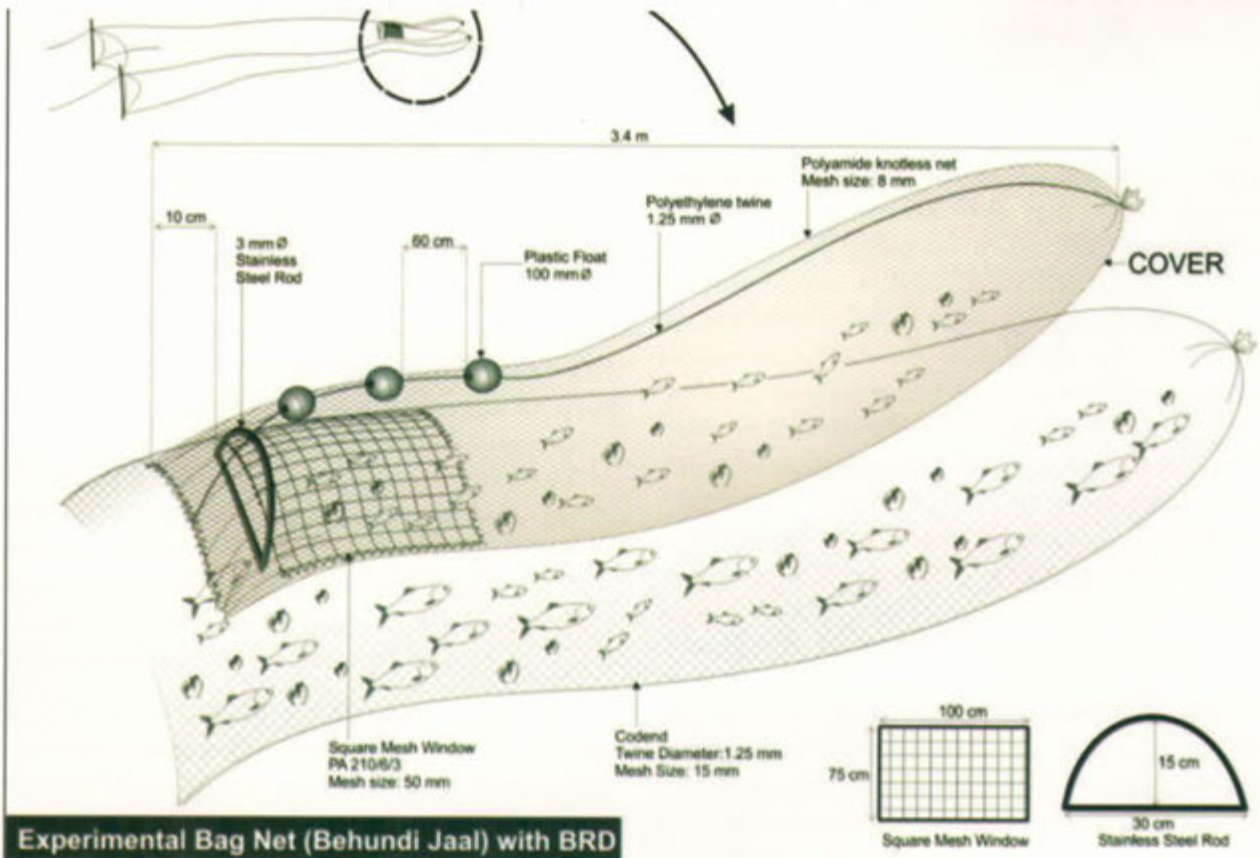




Stationary bag nets in Hooghly (Inset - Hilsa juveniles caught in bag nets in Narmada)



Fabrication of BRD in a bag net



of the total catch excluded from the BRD. The length of the excluded hilsa ranged from 37 mm to 55 mm. The experiment is in the preliminary stage and seasonal and temporal variations in the catch and size classes need to be studied,

for optimizing the mesh sizes and position of the BRD in the net for enhancing the juvenile's escapement, especially hilsa, from the bag nets.

Dr. M.P. Remesan, Dr. P. Pravin and Dr. V.R. Madhu
Fishing Technology Division, CIFT, Cochin

Microwave Blanching and Quick Chilling of Fish for Shelf-life Extension

With the changing life styles, the use of microwave ovens is becoming more popular in developing countries

like India as the equipment has become affordable in the recent years. Domestic microwave ovens are conveniently

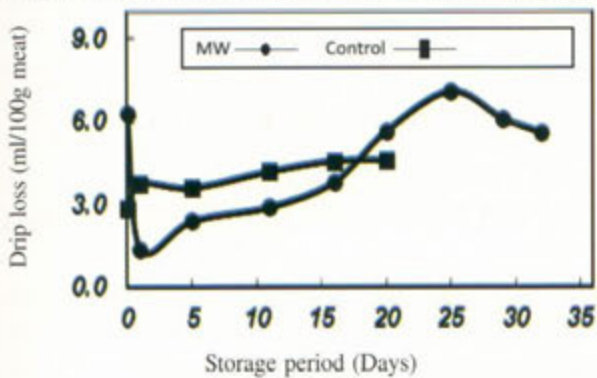




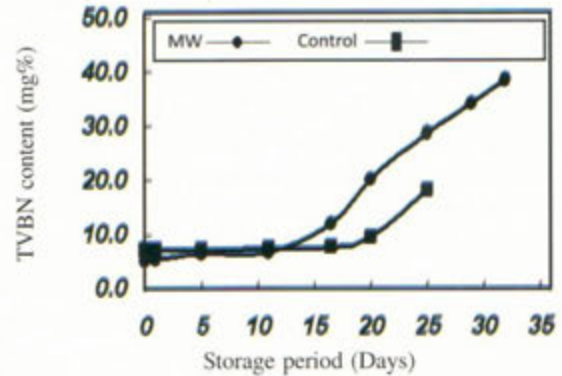
used to heat foods as they do it faster than conventional methods. A short processing time is highly desirable in food industry in terms of less nutritive and sensory loss. In addition, mild heating using microwave oven followed by quick chilling improves the texture of fresh fish as it softens the connective tissue proteins, at the same time maintaining the functionalities of myofibrillar proteins. Recently, CIFT has initiated work on microwave processing of fish incorporating the hurdle concept for shelf life extension of fresh fish.

Microwave blanching of *Ompok pabda* gutted fish was carried out in combination with quick chilling and vacuum packaging techniques. Blanching of gutted Pabda fish was achieved using a home model microwave oven at a core temperature of 70 °C for 1 min. The fish samples were

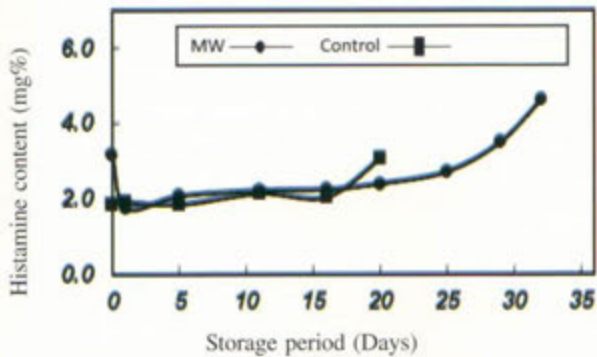
vacuum packed before heating and separate control samples were maintained for comparison. After heating, the samples were quick chilled using crushed ice and were further stored at -4 °C. The microbiological parameters were analyzed at regular intervals for total mesophilic, psychrophilic and thermophilic count, enterobacteriaceae in addition to common pathogenic/spoilage organisms like *E. coli*, *Streptococcus*, *Vibrio parahaemolyticus*, *Salmonella*, *Listeria* and *Staphylococcus*. The biochemical parameters analyzed included TVBN, NPN, alpha amino Nitrogen, FFA, PV, TBA, Drip loss and pH and Histamine. Results indicated that microwave blanched samples remained in acceptable condition for more than a month. On the other hand, control vacuum packed samples were to be rejected after 20 days of storage under chilled condition.



Changes in Drip loss of Pabda fish during chilled storage



Changes in Total Volatile Base Nitrogen of Pabda fish during chilled storage



Changes in Histamine content of Pabda fish during chilled storage



Microwave blanched Pabda gutted fish

Control vacuum packed Pabda gutted fish

Dr. P.K. Binsi, Dr. George Ninan*, Dr. S. Visnuvinayagam, P. Viji and Dr. R. Chakrabarti

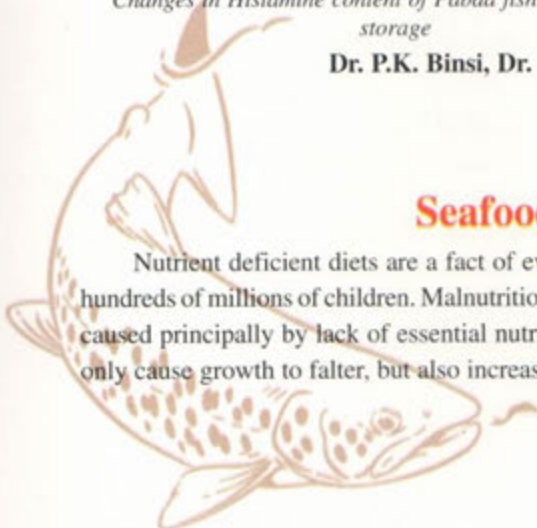
Mumbai Research Centre of CIFT

*Fish Processing Division, CIFT, Cochin

Seafood for Fighting Malnutrition

Nutrient deficient diets are a fact of everyday life for hundreds of millions of children. Malnutrition is a pathology caused principally by lack of essential nutrients which not only cause growth to falter, but also increase susceptibility

to common diseases such as common cold or bout of diarrhea, which can kill a malnourished child. Food that cannot provide the right blend of energy including high quality protein, essential fats, and carbohydrates as well as





vitamins and minerals definitely impair growth and development, increase the risk of death from common childhood illness, or result in life-long health consequences.

Current approaches to address malnutrition in children have serious limitations. The fortified cereals presently scattered through food aid do not meet minimal standard requirements. In places where families have little or no access to highly-nutritious foods, behavior change approaches to malnutrition that focus on education about proper food choices, and hygiene practices are not enough to address the problem. They need access to energy-dense, nutrient-rich foods. Exclusive breast feeding meets nutritional needs until six months of age, and beyond that, young children need 40 essential nutrients to grow and be healthy. Interestingly, fish is probably the most affordable food to provide all the 40 essential nutrients. Fish and fishery products form a substantial part of human diet, of both poor and wealthy. Seafood is an excellent source for proteins, vitamins, trace elements and polyunsaturated fat (Omega-3 fatty acids). Though there is a growing awareness of the beneficial role of fish and other marine foods in human nutrition, information about its importance in lowering risk of malnutrition related chronic diseases are relatively scanty. Following is a brief account of how fish is effective in attenuating malnutrition in children.

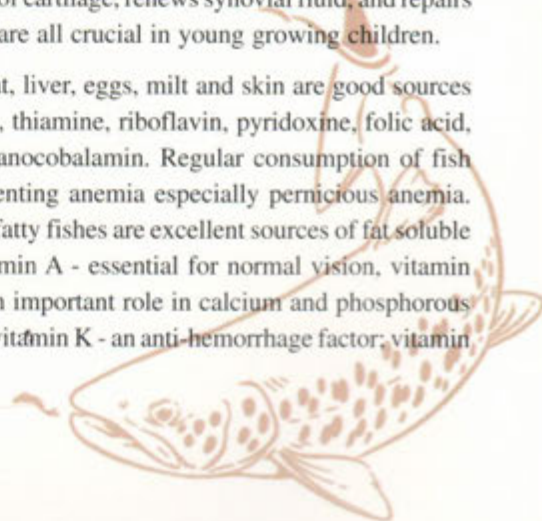
Fish and other marine life are rich sources of Omega-3 fatty acids, eicosapentaenoic and docosahexaenoic (EPA and DHA), especially the low value fishes such as sardine, mackerel, anchovies etc. EPA and DHA are essential for the development of brain and heart tissue. EPA and DHA play a major role in modulating lipid and prostaglandin metabolism, required for proper functioning of vascular system in growing children. They also influence kidney function by modulating retention of water and removal of excess sodium, which plays a major role in a child's behavior. DHA enhances memory power and is critical to normal eye and vision development in the early and later stages of life of a human being. Along with linoleic acid it makes 1/3rd of fatty acid in human brain and retina.

Fish contains high amount of highly digestible protein which can be incorporated into protein supplement for human consumption. Presence of essential amino acids in required proportion like lysine, histidine, methionine and cysteine with high bio availability and minerals makes fish highly nutritious. Non-protein amino acid taurine is found

to be rich in free amino acid pool which is beneficial in regulating heart function. Fish proteins lessen the risk of micro-albuminuria. It also improves blood lipid profile of obese children. Fish protein powder can be used to formulate infant foods, soups and protein containing beverages to enhance their protein content and nutritive value. Fish protein hydrolysate prepared from low value fishes contains important bioactive peptide fraction like gastrin, calcitonin gene related peptides and some growth promoting peptides which play a key role in our metabolic pathways. Fish protein hydrolysate suppresses both hypertension and atherogenesis. Fish peptides also have significant bioactivities such as they enhance the uptake and bioavailability of calcium. Collagen found in skeleton, fins, skin and air bladder (source of pure collagen) of fish is a good source of amino acids required for the synthesis of extra cellular matrix protein of connective tissue in young children. Its supplementation is also beneficial in the normal functioning of fragile bone joints that occur in athletic young children.

N-acetyl glucosamine (NAG) moiety present in human milk promotes the growth of bifidobacteria which produces lactase required for digestion of milk lactose. Cow's milk contains limited amount of NAG moiety and some infants fed on cow's milk may have indigestion. Supplementation of chitosan, a byproduct of crustaceans exoskeleton chitin, helps to overcome lactose intolerance in children by influencing the microflora associated with gut. D-glucosamine, a monomeric unit of chitosan occurs naturally in humans and is essential for the construction of cartilage in young children. Glucosamine stimulates the production of glycosaminoglycans (the key structural components of cartilage) as well as the incorporation of sulfur into cartilage. Sulfur is necessary for making and repairing cartilage. Glucosamine is effective for easing osteo-pain, aids in rehabilitation of cartilage, renews synovial fluid, and repairs joints, which are all crucial in young growing children.

Fish meat, liver, eggs, milt and skin are good sources of B vitamins, thiamine, riboflavin, pyridoxine, folic acid, biotin and cyanocobalamin. Regular consumption of fish helps in preventing anemia especially pernicious anemia. Fatty or semi fatty fishes are excellent sources of fat soluble vitamins, vitamin A - essential for normal vision, vitamin D - playing an important role in calcium and phosphorous metabolism; vitamin K - an anti-hemorrhage factor; vitamin





E - a potent antioxidant involved in counteraction of free radical mediated oxidative damage to the cell membranes. Large quantity of vitamin A, D and E (500-3000 IU) are present in liver and body oils of shark and tuna.

Fish and shellfish are valuable sources of Ca and P, and trace elements, Fe, Cu, Se and Zn. Calcium powder from fish bones like back bone of tuna and oyster shell can be used to combat calcium deficiency in diet, particularly of children. Calcium deficiency can lead to bone degeneration and spine curvature in children. Salt water fish have high content of iodine essential for brain and thyroid function. Sodium content in fish is relatively low, making it suitable for low sodium diets. Tuna is a rich source of macro minerals like Mg, which contributes to the hardness of bone and acts as a cofactor for certain enzymes important in nerve and muscle function. Tuna is also an important source of essential antioxidant trace element Se which provides protection against heavy metal poisonings and a variety of carcinogens. Crustaceans and shellfish are

richest source of Cu which is essential for normal blood formation, maintenance of blood vessels, tendons and bones and health of central nervous system.

Squalene, an isoprenoid molecule present in fish liver oils, especially shark, has been reported to possess antilipidemic, antioxidant and membrane stabilizing properties. Squalene promotes oxygenation of about six billion oxygen reliant cells, thus vitalizing weakened body cells and promoting good health at the most basic level of life.

Current strategies to address malnutrition elicit mixed response. Promoting fish as health food among nutritionally challenged children through direct nutrition programmes that ensure infants and young children from even the poorest families to have access to quality foods including fish would help to alleviate early childhood malnutrition. Through such programmes, substantial progress can be made towards freeing children from the consequences that come with malnutrition at an early age.

Dr. R. Anandan, Dr. K.K. Asha, Dr. Niladri S. Chatterjee, Dr. Suseela Mathew and Dr. P.T. Lakshmanan
Biochemistry & Nutrition Division, CIFT, Cochin

Quality Evaluation of Prawn Soup Concentrate During Chilled Storage

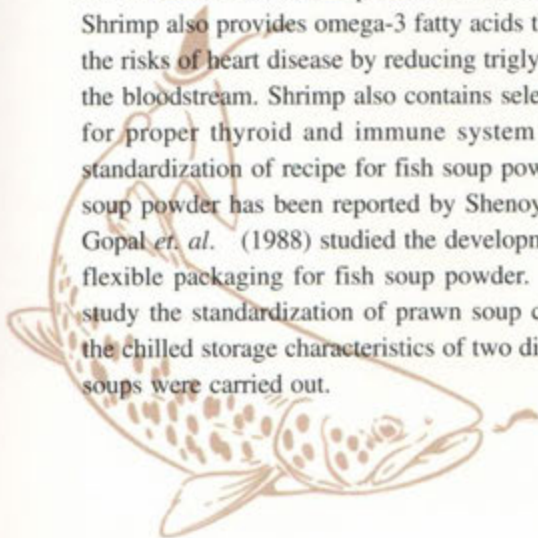
Soup is a liquid food product normally served in hot condition as an appetizer before the main food. Soup prepared from different food products like vegetables, meat, egg, chicken etc. are very popular and widely consumed in different parts of the world. They are rich in dietary constituents like protein, vitamins, fat and minerals.

Seafood's are generally highly nutritious with significant protein content (12-26%) and the levels of poly unsaturated fatty acids which contribute to health benefits for human nutrition. Shrimp is an excellent source of protein. Shrimp also provides omega-3 fatty acids that help reduce the risks of heart disease by reducing triglyceride levels in the bloodstream. Shrimp also contains selenium, essential for proper thyroid and immune system function. The standardization of recipe for fish soup powder and prawn soup powder has been reported by Shenoy *et al.* (1983). Gopal *et al.* (1988) studied the development of suitable flexible packaging for fish soup powder. In the present study the standardization of prawn soup concentrate and the chilled storage characteristics of two different types of soups were carried out.

Prawn soup concentrate was prepared by following the method of Shenoy *et al.* (1983) with slight modifications. Fresh prawn (*Fenneropenaeus indicus*) of size 12-14cm was collected from the landing centre near Cochin and brought to the laboratory under iced condition. The ingredient combination of the base is as follows: Cooked Prawn - 500g, Salt - 114g, Vegetable fat - 84g, Onion - 500g, Pepper - 10g, Coriander - 8g, Carboxy Methyl Cellulose - 2g and Ascorbic Acid - 10g. One combination (Sample M) was made by adding spices (1% garlic + 1% ginger) and the second with tomato paste 5% (Sample T) to the basic composition. The control sample had only basic ingredients (Sample C).

The products were stored in the chilled storage 3 ± 2 °C and the shelf life studies were carried out.

Proximate composition of prawn soup concentrate was assessed. The crude protein, fat, moisture and ash were determined by standard methods described in AOAC (2000). Colourimetric analysis of the products were performed with a Hunter lab Miniscan ® XE plus





spectrocolourimeter (Hunter Associates Laboratory, Inc. Reston, Virginia, USA). Measurements were recorded using the L* a* b* colour scale (CIE, 1986). Total Volatile Base Nitrogen (TVBN) content was determined by the Conway micro diffusion method of Beatty and Gibbons (1937). Thiobarbituric Acid Value (TBA) was determined using AOAC (2000) method. pH was estimated using pH tutor (Butech instruments). The total Aerobic Plate Count (APC) was determined as per standard methods (BAM, 1995). The sensory evaluation was carried out by using a 9 point hedonic scale, as described by Peryam and Pilgrims (1957). The sample was mixed with water at the ratio 1:5 and boiled for 1 min. and served hot to the panelists who were asked give the numerical scores for each products.

The proximate composition of the different samples prepared is given in Table below. The moisture content was found to be below 50% in all the samples since only minimum water was used during the preparation of the product. Protein content was slightly higher in spices-incorporated samples which could be due to the differences in the moisture content. Other nutritional components like fat, carbohydrate and minerals were also almost same in all the three samples. In dried soup powder Shenoy *et. al.* (1983) reported a moisture content of 8-10% and protein content of 21-25%.

Proximate compositions of soup concentrate samples

	Sample M	Sample C	Sample T
Moisture content	47.34	49.57	47.90
Ash content	10.21	9.84	10.56
Protein	15.92	15.48	15.42
Fat	7.50	7.22	7.54
Carbohydrate (by difference)	19.03	17.89	18.58

Sample M - spice added sample; Sample T - tomato added sample; Sample C - control; Values expressed as percentage

Figure 1 shows changes in pH during the chilled storage of products. In all samples there is a gradual increase in pH values. The increase in the pH are related to the accumulation of degradation compounds of protein by microbial action during fish muscle spoilage. The pH of Sample C is high, while Sample T added with tomato had the lowest pH value, Comparatively Sample T has got only a slight increase in pH value.

TBA index is the most used indicator for advanced lipid oxidation studies. The changes in TBA during chill storage of prawn soup concentrate is given in Figure 2. The

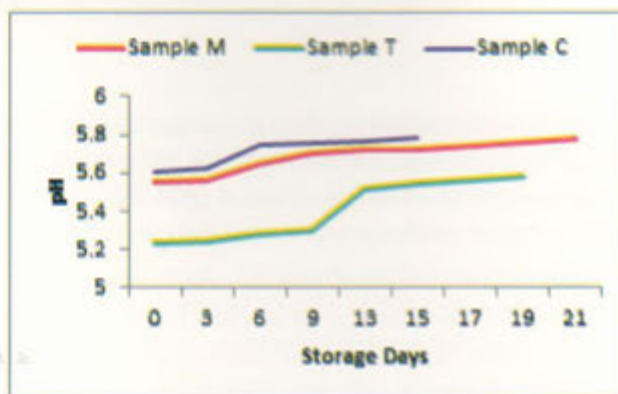


Fig. 1. Changes in pH of Pabda fish during chilled storage

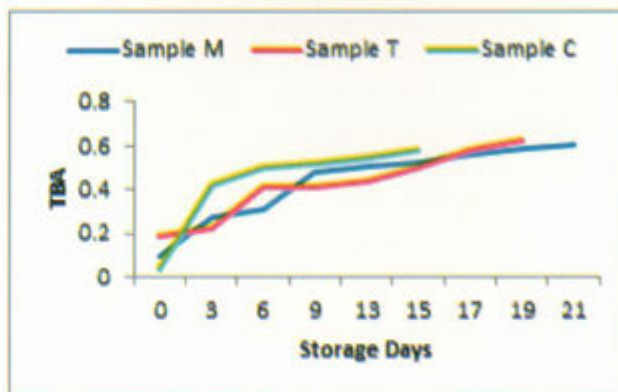


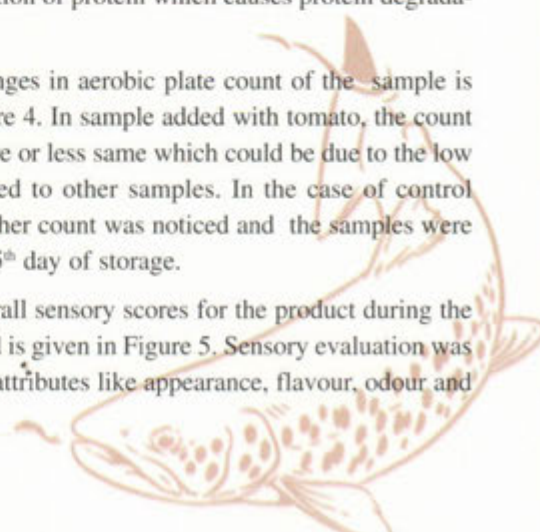
Fig. 2. Changes in TBA value of the samples during chilled storage

TBA value shows an increasing trend during storage. The TBA value of control sample increased sharply during the period of storage, where in other two a steady slow increase was noticed. In Sample M the slow increase could be due to the effect of spices added.

The changes in TVB-N during chill storage is depicted in Figure. 3. The TVBN value showed an increasing trend during storage period. On the 15th day of storage the TVBN value of Sample C increased to 42. The increase in TVBN value is comparatively less in the Sample M and it reached 41.6 mg/100g in 21 days of chilled storage. The increase in TVB-N value may be due to the psychrophilic bacteria and its utilization of protein which causes protein degradation.

The changes in aerobic plate count of the sample is given in Figure 4. In sample added with tomato, the count remained more or less same which could be due to the low pH compared to other samples. In the case of control samples a higher count was noticed and the samples were rejected on 15th day of storage.

The overall sensory scores for the product during the storage period is given in Figure 5. Sensory evaluation was based on the attributes like appearance, flavour, odour and



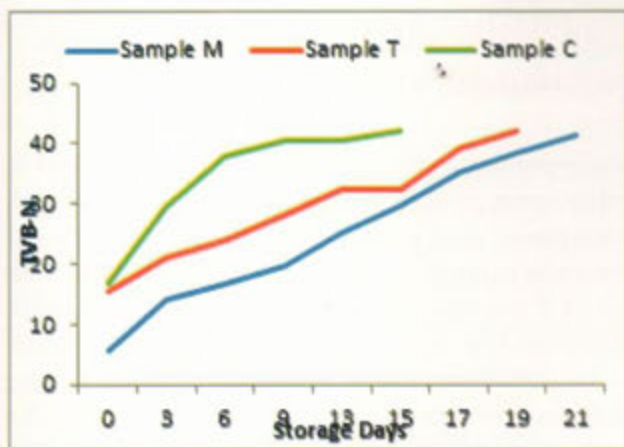


Fig. 3. Change in TVBN value during the storage period

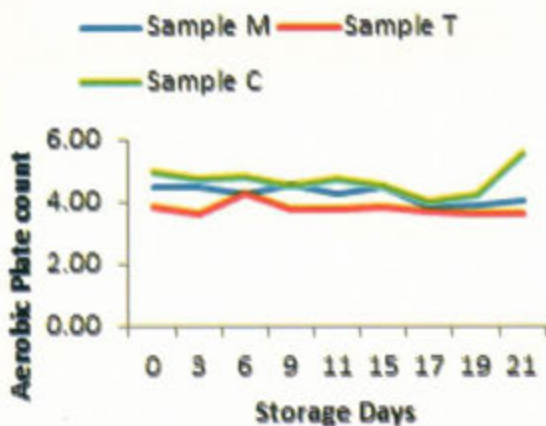


Fig. 4. Changes in Aerobic Plate Count of the products during chilled storage

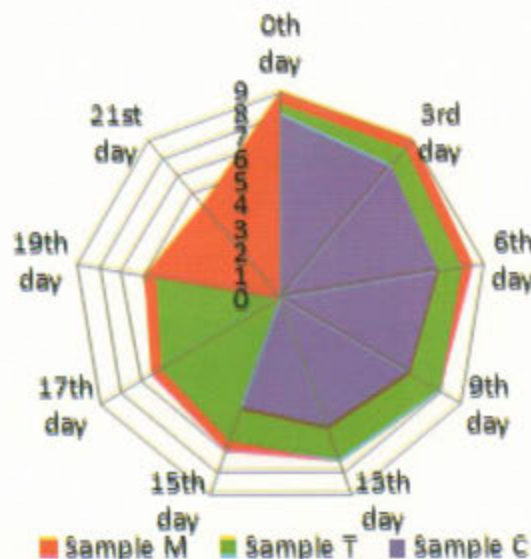


Fig.5. Sensory scores during the storage period

texture for which scores were given by the panel and the overall scores was calculated. Hedonic score show a gradual reduction in quality during chilled storage of the products. The control samples developed clear off taste on 15th day of spoilage whereas Sample T had 19 days of storage life. In the case of sample added with additional spice the score was 5.3 on 21st day of storage after which the sample was considered spoiled. The extended storage life of Sample M could be due to the effect of added spices.

The prawn soup concentrate is a ready to constitute product which is highly nutritious and easy to prepare. The product is intended to be stored under chilled condition and has advantages over the conventional soup powder, which requires drying to a very low moisture level which in turn impair the colour of the product. The present study shows that the product has reasonable shelf life under chilled condition.

References

AOAC (2000) - Official Methods of Analysis. 17th Edn. Association of Official Analytical Chemists, Washington, DC, USA

AOCS (1989) - Official Methods of Recommended Practices of American Oil Chemists Society, Champaign USA

BAM (1995) - Bacteriological Analytical Manual. 8th Edn., AOAC International, USA.

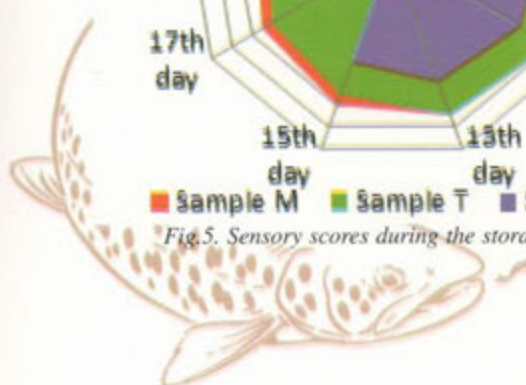
Gopal Srinivasa T.K., Thankamma R., Shenoy A.V., Rao. C.V. and Govindan, T.K. (1988) - Development of flexible packaging for fish soup powder. In: M. Mohan Joseph (Ed). The First Indian Fisheries Forum. Proceedings of Asian Fisheries Society Indian Branch, Mangalore, pp 369-372.

Peryam, D.R. and Pilgrim, F.J. (1957) - Hedonic scale method of measuring food preferences, *Food Technol.* 11(9): 9.

Shenoy, A.V., Madhavan P., Thankamma R., Prabhu P.V. and Gopakumar. K. (1983) - Feasibility Report on Production of Fish Soup Powder, CIFT, Cochin.

Tarladgis, B.G, Watts, B.M., Younathan, M.T. and Dugan, L. (1960) - A distillation method for the quantitative determination of malonaldehyde in rancid foods. *J. Am. Oil Chem. Soc.* 37: 44-48.

Dr. A.A. Zynudheen, Dr. George Ninan, Dr. S.K. Panda*, C.G. Joshy and Dr. C.N. Ravishankar
Fish Processing Division, CIFT, Cochin
*Quality Assurance and Management Division, CIFT, Cochin





Preparation and Quality Evaluation of Value Added Products from *Litopenaeus vannamei*

Shrimps are extremely good source of protein, and are very low in fat and calories, making them a very healthy choice of food. Apart from this it has high cholesterol content and low saturated fat, which is the fat that raises the cholesterol level in the body. Pacific white shrimp (*Litopenaeus vannamei*) accounts for 90% of the global aquaculture shrimp production. In the present study, value added products from *L. vannamei* were prepared and their quality characteristics during frozen storage were studied.

Preparation of coated product

Pacific white shrimps were collected from a culture farm in Tamil Nadu and brought to the laboratory under iced condition (1:1). The prawns were washed thoroughly in potable water, peeled and washed again. Then they were subjected to dip treatment at 3% salt solution for 2 min. After draining, it was battered (Batter ingredients are: Maida - 1kg, Corn flour - 100g, Bengal flour - 100g, Salt - 15g, Guar gum - 5g, Turmeric powder - 5g, Sodium tri poly phosphate - 5g) and breaded and flash fried for 1 min. After cooling, packed in thermoformed plastic trays (HIPP) and blast frozen at -40 °C for 90 min. and stored at -20 °C for further studies.

Preparation of prawn masala

Ingredients used for the preparation of prawn masala are: Prawn - 1kg, Green Chillies - 7g, Ginger - 200g, Garlic - 200g, Asafoetada - 10g, Fenugreek - 5g, Chilly powder - 70g, Garam masala - 10g, Turmeric powder - 10g, Salt - 7g, Tomato - 200g, Oil - Required quantity, Vinegar - 200ml. Peeled and deveined vannamei are shallow fried in a little oil for 5 minutes and kept aside. The ingredients green

chilli, ginger and garlic were made into paste and fried in oil till it turns golden brown colour. Then asafoetida powder, chilli powder and fenugreek powder were added and stauted for 5 min. in low flame and the remaining ingredients were added. It was mixed with tomato sauce, fried prawns were added and again mixed well. After cooling the product to room temperature, vinegar was added. Then the product was packed in thermoformed plastic trays (HIPP) and sealed



Spicy prawn gravy

Coated product

and blast frozen at -40 °C for 90 min. and stored at -20 °C.

Quality analysis of coated products and spicy prawn gravy during storage

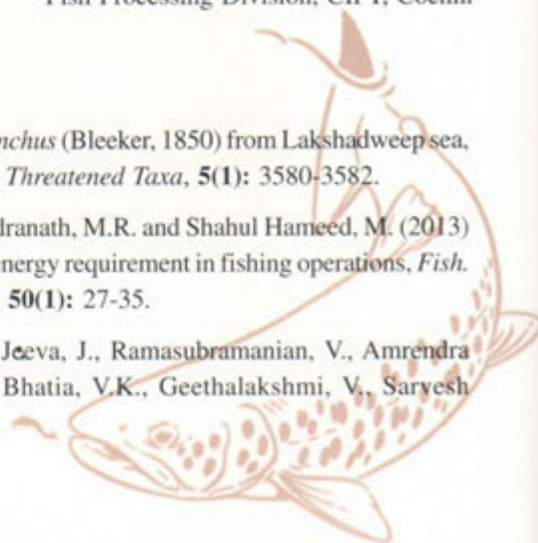
Proximate composition of coated products contained 57.26% moisture, 22.02% protein, 6.05% fat and 3.5% ash. The prawn masala had 60.35% moisture, 18.15% protein, 12.48% fat and 2.28% ash. Both the samples were drawn at monthly interval up to six months and qualities were analyzed. During frozen storage there is no significant difference ($p < 0.05$) in moisture, pH and over all acceptability of both coated products and prawn masala products. Total volatile base nitrogen, free fatty acid, peroxide value and thiobarbituric acid showed gradual increase during storage and all were within the acceptable limits in both the samples.

Dr. A. Jeyakumari, V. Renuka, Dr. George Ninan, Dr. A.A. Zynudheen and Dr. C.N. Ravishankar
Fish Processing Division, CIFT, Cochin

Publications

Research Papers

1. Aneesh Kumar, K.V., Paresh, S.K., Pravin, P., Madhu, V.R. and Meenakumari, B. (2013) - Effect of hook design on long line catches in Lakshadweep sea, India, *Indian J. Fish.*, **60(1)**: 21-27.
2. Aneesh Kumar, K.V., Paresh, S.K., Pravin, P., Meenakumari, B. and Radhakrishnan, E.V. (2013) - First record of the grey reef Shark *Carcharinus amblyrynchus* (Bleeker, 1850) from Lakshadweep sea, India, *J. Threatened Taxa*, **5(1)**: 3580-3582.
3. Boopendranath, M.R. and Shahul Hameed, M. (2013) - Gross energy requirement in fishing operations, *Fish. Technol.* **50(1)**: 27-35.
4. Charles Jeeva, J., Ramasubramanian, V., Amrendra Kumar, Bhatia, V.K., Geethalakshmi, V., Saryesh





- Kumar Premi and Ramasundaram, P. (2013) - Forecasting technological needs and prioritizing factors for the post-harvest sector of Indian fisheries, *Fish. Technol.* **50(1)**: 87-91.
5. Femeena Hassan, Sangeetha K. Prathap, J. Charles Jeeva, Saleena Mathew and Remya Babu, M. (2013) - Economic feasibility analysis of fisherwomen based microenterprises, *Indian J. Fish.*, **60(1)**: 125-130.
 6. Madhusudana Rao, B., Floyd Inman III, Len Holmes and Lalitha, K.V. (2013) - Chitinase production in a fed-batch fermentation of colloidal chitin using a mixed culture of *Vibrio harveyi* and *Vibrio alginolyticus*, *Fish. Technol.* **50(1)**: 66-74.
 7. Madhusudana Rao, B. and Surendran, P.K. (2013) - Detection of *ctx* gene positive non-O1/non-O139 of *V. cholera* in shrimp aquaculture environments, *J. Food Sci. & Technol.* **50(3)**: 496-504.
 8. Rajamoorthy, K., Pradeep, K., Anandan, R., Libin Baby, Sankar, T.V. and Lakshmanan, P.T. (2013) - Biochemical composition of Myctophid species *Diaphes watasei* and *Myctophum obtusirostre* caught from Arabian sea, *Fish. Technol.* **50(1)**: 41-44.
 9. Rakesh Kumar and Lalitha, K.V. (2013) - Prevalence and molecular characterization of *Vibrio cholera* O1, Non-O1 and Non-O139 in tropical seafood of Cochin, *Food-borne Pathogens & Disease*, **10**: 278-283.
 10. Sivaperumal, P. and Sankar, T.V. (2013) - Toxicity of organophosphorus insecticide - Methyl Parathion on rohu (*Labeo rohita*), *Fish. Technol.* **50(1)**: 45-49.
 11. Srinivas Gopal, T.K. and Boopendranath, M.R. (2013) - Seafood ecolabelling, *Fish. Technol.* **50(1)**: 1-10.
 12. Zynudheen, A.A., George Ninan and Ramachandran Nair, K.G. (2013) - Fermented fish powder based cookies from *Johnius* sp., *Fish. Technol.* **50(1)**: 97-99.

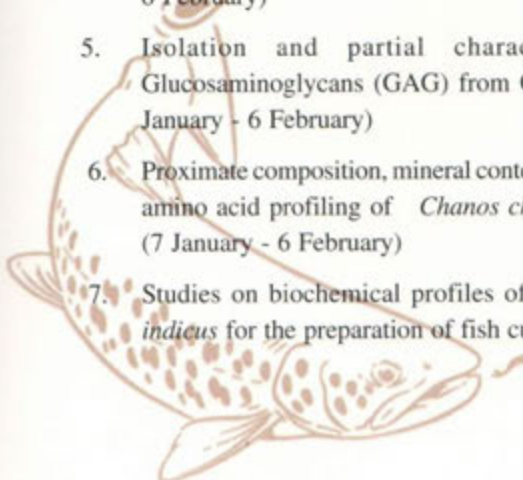
Technical Bulletins

1. "Trawl design developed at CIFT for small, medium and large trawlers" by P. Pravin, M.P. Remesan, V.R. Madhu and M.R. Boopendranath, CIFT Technology Advisory series, 108 p. (2013).
2. "Bycatch reduction for responsible trawling" by M.R. Boopendranath, P. Pravin, T.R. Gibin Kumar and S. Sabu (English and Hindi versions) (2013).

Training Programmes

Cochin

1. Nutrient profiling of tuna waste (10 December, 2012 - 15 January, 2013)
2. Development and standardization of an extruded snack from prawn (10 December, 2012 - 15 January, 2013)
3. Modern analytical techniques in biochemistry (19 December, 2012 - 18 January, 2013 & 11-23 March)
4. Proximate composition, mineral content, fatty acid and amino acid profiling of *Lactarius lactarius* (White fish) and *Loligo duvacei* (Indian squid) (7 January - 6 February)
5. Isolation and partial characterization of Glucosaminoglycans (GAG) from Cuttlefish ink (7 January - 6 February)
6. Proximate composition, mineral content, fatty acid and amino acid profiling of *Chanos chanos* (Milkfish) (7 January - 6 February)
7. Studies on biochemical profiles of *Platycephalus indicus* for the preparation of fish cutlet: Determination of nutrient composition and microbial characteristics of the fish cutlet formulated (7 January - 28 February)
8. Evaluation of nutrient profiling of *Anadostoma chacunda* for the preparation of essential amino acid enriched soup powder by incorporating defatted fish protein powder (7 January - 28 February)
9. Seafood quality assurance (14-26 January)
10. Post harvest processing and value addition of fish and shellfish (15-16 January)
11. Sample preparation for heavy metal analysis by AAS (16 January)
12. Fish processing (28 January - 8 February)
13. HACCP concepts (18-25 February)
14. Quality changes of *sous vide* processed fish balls from Red Snapper under chilled storage (2-4 °C) (1 January - 28 February)
15. Quality changes of vacuum packed fish finger





prepared from Red Snapper under chilled storage (2-4 °C) (1 January - 28 February)

16. Value added fishery products (1 December 2012 - 2 March, 2013)
17. Production of fish pickle and its related quality aspects (11-12 March)
18. Application of high pressure for food processing (12 March)
19. Characterization of plastic degrading bacteria from aquatic and terrestrial environment (17 December, 2012 - 16 March, 2013)



Faculty and trainees of Laboratory techniques for microbiological examination of seafoods (Visakhapatnam)

Visakhapatnam

1. Hygienic handling of fish and development of value added products (18 January)
2. Laboratory techniques for microbiological examination of seafoods (11-22 March)

Veraval

1. Microbiological quality of seafood (17-23 January)

Mumbai

1. Microbiological quality control of seafoods (25 February - 2 March)
2. Sensory evaluation of seafood (14-16 March)



Microbiological quality control of seafoods (Mumbai)



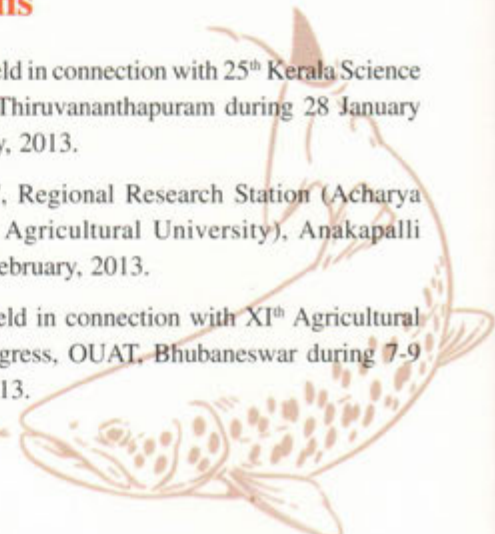
Faculty and trainees of Microbiological quality of seafood (Veraval)



Sensory evaluation of seafood: Participants and Faculty (Mumbai)

Participation in Exhibitions

1. Exhibition (ICAR Pavilion) held in connection with 100th Indian Science Congress, Kolkata during 3-7 January, 2013.
2. Global Konkani Festival, Mumbai during 4-7 January, 2013.
3. Exhibition held in connection with International symposium on Genomics in aquaculture, CIFA, Bhubaneswar during 22-23 January, 2013.
4. Exhibition held in connection with 25th Kerala Science Congress, Thiruvananthapuram during 28 January to 3 February, 2013.
5. 'Kisan Mela', Regional Research Station (Acharya N.G. Ranga Agricultural University), Anakapalli during 5-6 February, 2013.
6. Exhibition held in connection with XIth Agricultural Science Congress, OUAT, Bhubaneswar during 7-9 February, 2013.





7. Exhibition held in connection with PAF Congress on Public-private partnership in aquaculture, CIFRI, Barrackpore during 9-11 February, 2013.
8. 'Kisan Mela' organized by Central Horticultural Experimental Station at Vejalpur, Godhra on 16 February, 2013.

9. Kerala Agri Food Pro Meet, Cochin during 17-21 February, 2013.
10. 'Krishi Darpan - 2013', North Parur, Ernakulam on 27 March, 2013.



CIFT stall at 'Global Konkani Festival'



Dr. B. Madhusudana Rao, Senior Scientist explaining about CIFT activities to Prof. Laszlo Orban (Temasek Life Sciences Laboratory, Singapore), Dr. A.S. Ninawe (Advisor, DBT) and Dr. P. Jayashankar (Director, CIFA) at CIFA, Bhubaneswar



Dr. B. Meenakumari, DDG (Fy.), ICAR in CIFT stall at OUAT, Bhubaneswar



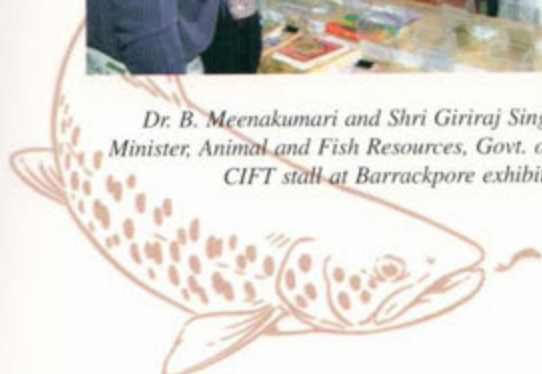
'Kisan Mela' at Anakapalli



Dr. B. Meenakumari and Shri Giriraj Singh, Hon'ble Minister, Animal and Fish Resources, Govt. of Bihar visiting CIFT stall at Barrackpore exhibition



Dr. N. Krishnakumar, DDG (Horticulture) visiting CIFT stall during the 'Kisan Mela' at Vejalpur





Outreach Programmes

During the quarter the following outreach programmes were conducted by the Institute:

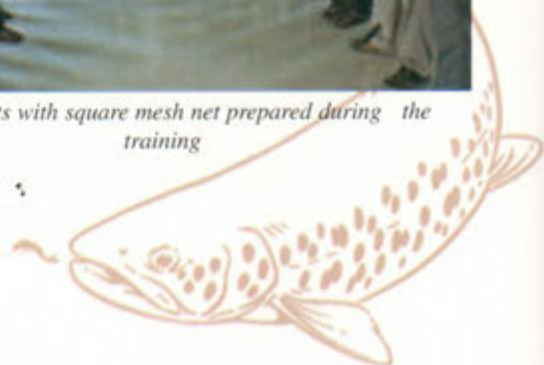
1. One day capacity building programme on Preparation of value added products from fish and shellfish at Palluruthy, Cochin on 13 February, 2013.
2. Training programme on Fabrication of square mesh net in association with NETFISH, MPEDA at Vanakbara, Veraval on 22 February, 1 March and 22 March, 2013.
3. Two training cum workshop programmes on Hygienic handling and fresh fish trading for coastal women and Hygienic production and marketing of dry fish for coastal women conducted in collaboration with 'Fish For All' facility, M.S. Swaminathan Research Foundation, Poompohar, Tamil Nadu during 26-27 February, 2013.
4. Training cum demonstration on Hygienic production of smoke cured fish using Community Fish Smoking Kiln at KVK, Ranipol, Sikkim on 4 March, 2013.
5. Training cum demonstration on Hygienic production of smoke cured fish using Community Fish Smoking Kiln at KVK, Roing, Arunachal Pradesh on 8 March, 2013.
6. Training cum demonstration on Hygienic production of smoke cured fish using Community Fish Smoking Kiln at Brooders Fish Farm, Half Nagarjun, Dimapur, Nagaland on 11 March, 2013.
7. Training cum demonstration on Hygienic production of smoke cured fish using Community Fish Smoking Kiln at ICAR Research Complex for NEH Region, Meghalaya on 15 March, 2013.
8. Training cum demonstration on Hygienic production of smoke cured fish using Community Fish Smoking Kiln at Nangthymain, Meghalaya on 16 March, 2013.
9. Training cum demonstration on Hygienic production of smoke cured fish using Community Fish Smoking Kiln at KVK, Lengpui, Mizoram on 18 March, 2013.
10. Training cum demonstration programme on Harvest and post harvest technologies at Iduli and Jia villages of Roing, Arunachal Pradesh during 17-19 March, 2013.
11. Training cum demonstration programme on Hygienic production of smoke cured fish using Community Fish Smoking Kiln at ICAR Research Complex, Lembucherra, Tripura during 20-23 March, 2013.
12. Training programme on Fabrication and operation of improved gill nets for the tribal fishermen of Kabini reservoir, Karnataka on 25 March, 2013.
13. Training cum demonstration programme on Harvest and post harvest technologies at KVK, Lengpui, Mizoram during 26-28 March, 2013.
14. Training cum demonstration programme on Harvest and post harvest technologies at Jangareddygudem, West Godavari, A.P. during 26-28 March, 2013.



Training programme on Fabrication of square mesh net at Veraval



Participants with square mesh net prepared during the training





Basic and Strategic Research Project on 'Green Fishing Systems for Tropical Seas' Launched

'Green fishing systems for tropical seas', a research project funded by National Fund for Basic, Strategic and Frontier Application Research in Agriculture (NFBSFARA), ICAR, New Delhi, was formally launched by Shri K. Babu, Hon'ble Minister for Fisheries, Ports and Excise, Govt. of Kerala on 16 February, 2013 at CIFT, Cochin. The project with an outlay of ₹.12.25 crores envisages optimized energy saving fishing vessels and resource specific fishing gears and better operational methods to save energy. Goa Shipyard Limited, Goa, Garware-Wall Ropes Ltd., Pune and DSM India Pvt. Ltd., Mumbai are partnering CIFT in the attempt. This is the first ever basic and strategic research project to be undertaken under Public Private Partnership Mode in fisheries.

Speaking on the occasion the Chief Guest Shri K. Babu said that Kerala has been in the forefront in taking significant steps for the fisheries sector. It was one of the first states to bring in the monsoon trawl ban, which was emulated by other states. The sector has been witnessing increasing fish production but also has seen an increase in fleet size and capacities, making the sector more energy - intensive. Urgent and suitable interventions are needed to reduce energy consumption and suitable legislations that can curb the increase in effort. The Public Private Partnership Mode in which this project is being taken up is a welcome step.

Guest of Honour Prof. (Dr.) Mohan Joseph Modayil, Former Member, Agricultural Scientist Recruitment Board (ASRB), New Delhi flagged some of the important issues in the marine fisheries sector of Kerala and highlighted that increase in fish production need not necessarily imply sustainability of the stocks. The returns to the sector are not commensurate to the investments. Resources must be given time to recover and suitable management and governance measures are needed. Dr. A. Bandyopadhyay, National Co-ordinator, NFBSFARA, New Delhi, offering



Launching of the project by Shri K. Babu

felicitations stressed on the integration of partners, utilization of scientific resources and spread of the developed model with the involvement of stakeholders and support from the state.

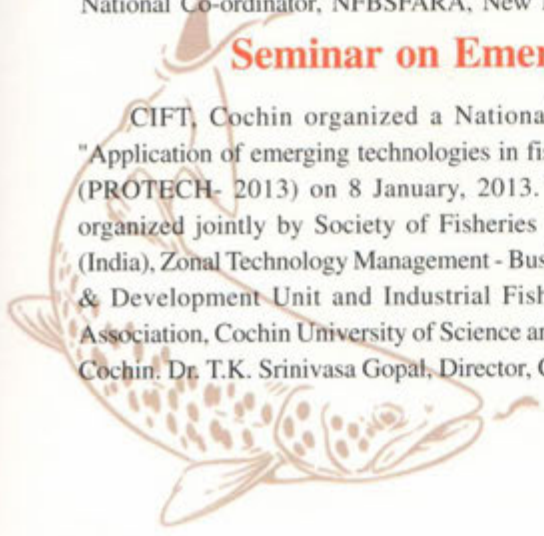
Shri Raghuvveer Singh, General Manager, GES and SR Goa Shipyard Limited, Shri Sanjay V. Raut, Vice President (R&D & New Business Development), Garware-Wall Ropes Ltd., Pune and Shri Rakesh Gaikwad, Business Development Manager (S&SE Asia), DSM India Pvt. Ltd., Mumbai also spoke on the occasion. Welcoming the gathering Dr. T.K. Srinivasa Gopal, Director, CIFT, said that the project is important in the backdrop of increasing energy use in the fisheries sector and resultant carbon emissions. Dr. Leela Edwin, Head, Fishing Technology Division and Principal Investigator of the Project proposed the vote of thanks.

Three new publications of Fishing Technology Division, 'Trawl Designs developed at CIFT for Small, Medium and Large Trawlers' and 'Bycatch Reduction Devices for Responsible Shrimp Trawling' (English and Hindi versions) were also released by the Hon'ble Minister.

Seminar on Emerging Technologies in Fish Processing

CIFT, Cochin organized a National seminar on "Application of emerging technologies in fish processing" (PROTECH- 2013) on 8 January, 2013. The Seminar organized jointly by Society of Fisheries Technologists (India), Zonal Technology Management - Business Planning & Development Unit and Industrial Fisheries Alumni Association, Cochin University of Science and Technology, Cochin. Dr. T.K. Srinivasa Gopal, Director, CIFT delivered

the introductory remarks and also Chaired the Technical Sessions that followed. Dr. T.V. Sankar, Secretary, SOFT(I) was the Co-Chair. Dr. C.N. Ravishankar, HOD, FP and PI, ZTM-BPD was the Covenor of the Seminar and the Co-Convenors were Dr. J. Bindu, Senior Scientist, CIFT and Shri Edwin Joseph, President, Industrial Fisheries Alumni Association, CUSAT.





Dr. H.S. Ramaswamy delivering lecture



Dr. T.K. Srinivasa Gopal delivering lecture



Visit to fish processing facilities at CIFT

The Seminar addressed specific consumer needs towards safe, healthy and minimally processed seafood. The innovative processes like High Pressure Processing, Pulsed Light treatment, Pulsed Electric Field application, Irradiation, Ultrasound processing, Microwave and Radio Frequency Heating etc. are environment friendly and sustainable with low energy requirements. Taking advantage of specific potentials and opportunities of these technologies a number of new products have been introduced into the market in the recent years. However, a need was felt for discussing the advantages and disadvantages so as to create an awareness among the users. The Seminar was aimed at introducing the emerging technologies to the seafood industry, entrepreneurs, researchers, academicians and students. The Seminar was attended by about 75 participants.

The invited lectures were given on the following topics:

- ◆ Emerging trends for seafood processing: High pressure processing - Principles and application by Dr. H.S. Ramaswamy, University of Mc Gill, Canada
- ◆ Emerging application of infrared and radio frequency processing technologies for foods by Dr. H. Umesh Hebbar, CFTRI, Mysore

- ◆ Application of pulse electric field technologies for food by Dr. S.N. Sabhapathi, DFRL, Mysore
- ◆ Pulsed light technology by Dr. T.K. Srinivasa Gopal, Director, CIFT
- ◆ Preservation of seafood by irradiation and ultra sonic technology by Dr. V. Venugopal, BARC, Mumbai
- ◆ An innovative microwave heating technology for seafood processing by Shri Bhavik Nayak, Hindustan Industrial Services Pvt. Ltd., Mumbai.

Offering the concluding remarks, Dr. T.K. Srinivasa Gopal opined that consumer education and acceptance is the key factor for the novel technologies. Similarly these processing technologies are effective interventions for safe foods. Application of such technologies should be validated for specific products.

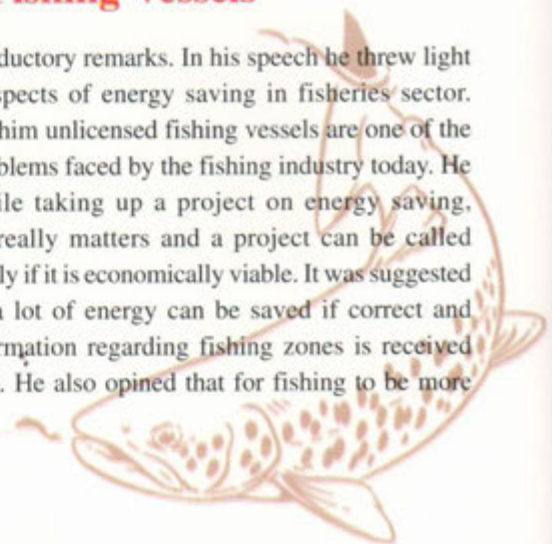
Earlier Dr. C.N. Ravishankar, HOD, Fish Processing & PI, ZTM-BPD Unit welcomed the gathering. Dr. T.V. Sankar, HOD, Quality Assurance & Management & Secretary, SOFT(I) proposed the vote of thanks. The Seminar concluded with a visit to the fish processing facilities at CIFT.

Workshop on Energy Saving in Fishing Vessels

A National Stakeholders' Workshop on 'Energy saving in fishing vessels' was organized under the project 'Green fishing systems for tropical seas' on 18 January, 2013 at CIFT, Cochin. The programme began with a welcome speech of Dr. Leela Edwin, HOD, FT and Principal Investigator of the project. A brief introduction about the project and workshop was given by her. The function was presided over by Dr. T.K. Srinivasa Gopal, Director, CIFT.

Dr. K. Gopakumar, former DDG (Fisheries), ICAR

gave the introductory remarks. In his speech he threw light on various aspects of energy saving in fisheries sector. According to him unlicensed fishing vessels are one of the important problems faced by the fishing industry today. He said that while taking up a project on energy saving, profitability really matters and a project can be called sustainable only if it is economically viable. It was suggested by him that a lot of energy can be saved if correct and accurate information regarding fishing zones is received by the fishers. He also opined that for fishing to be more





Dr. K. Gopakumar, former DDG (Fy.), ICAR giving the introductory remarks. On the dias are Shri M.V. Baiju, Convener of the workshop Dr. T.K. Srinivasa Gopal, Director, CIFT, and Dr. Leela Edwin, HOD, FT

viaible, factors like, efficiency of engine, design of fishing vessel, type of material etc. have to be given more importance. Facilities for bycatch reduction, marketing, storage, etc. can help resource conservation and thereby energy efficiency. There were a total of 76 participants consisting of boat builders, boatyard owners, auxiliary equipment manufacturers, naval architects, users of alternate energy in fishing boats, manufacturers of alternate energy powered boats, fishermen, researchers, academicians, scientists and students.

The technical session started with a talk on 'Energy utilization in fishing vessels' by Shri M.V. Baiju, Senior Scientist, CIFT, Cochin and Convener of the Workshop.

Technical Workshop on Green Fishing Systems

The first technical workshop of the project 'Green fishing systems for the tropical seas' was organized at CIFT, Cochin on 16 February, 2013. The Principal Investigators of the lead and the co-operating agencies presented the progress of the respective work components. Dr. K. Gopakumar, former DDG (Fisheries), ICAR and Dr. A.

The next presentation dealt by Shri Sandith Thandacherry, CEO, Navgathi Marine Design and Consultancy, Cochin was on the topic 'Alternate energy sources in fishing'. Shri Jayaprakash Mendon, Fishing fleet owner, Mangalore, delivered a lecture on 'Energy loss in fishing operations - A fishermen perspective'. The presentation on 'Introduction of solar energy in fisheries - An option for energy conservation' was done by Shri Vincent Jain, CEO, Association of Deep Sea Going Artisanal Fishermen, Thoothoor, Tamil Nadu.

The afternoon session started with the talk on 'Energy loss in boat building' by Shri K.I. Mathai, General Manager, Sea Blue Shipyard Ltd., Cochin. The presentations ended by a self explanatory video prepared by Shri Mohanlal, Entrepreneur from Alappuzha, which featured the experiences of fishermen who were using inboard 10 hp diesel engine. The fishermen were of the opinion that water and sound pollution, fuel consumption and cost are less compared to the existing outboard engines.

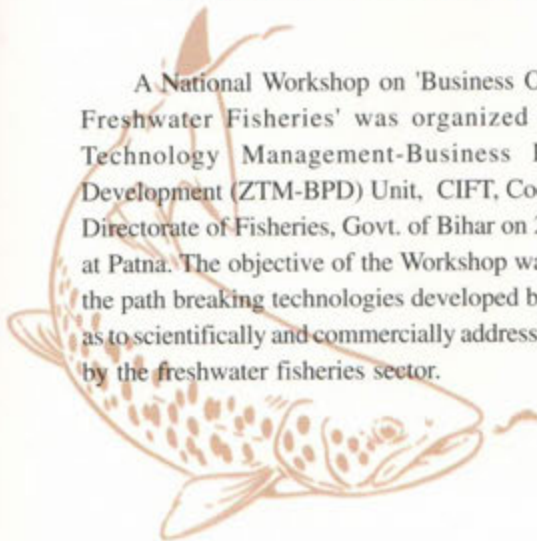
Shri M.V. Baiju, Convener of the Workshop presented the specifications of 19.8m vessel which is going to be built as a part of the project by Goa Shipyard Limited, co-partner of the project. Suggestions were received regarding the need for increasing the capacity of fuel tank, number of crew on the vessel and the comments were recorded. The Workshop came to an end with the participants completing a questionnaire on future energy scenario in fisheries. The formal vote of thanks was proposed by Shri M.V. Baiju.

Bandyopadhyay, National Coordinator chaired the sessions. From CIFT, Cochin Dr. Leela Edwin, HOD, FT, Dr. Saly N. Thomas, Dr. P. Pravin, Dr. M.P. Remesan, Principal Scientists, Shri M.V. Baiju, Senior Scientist and Dr. V.R. Madhu, Scientist attended the Workshop.

National Workshop on Business Opportunities in Freshwater Fisheries

A National Workshop on 'Business Opportunities in Freshwater Fisheries' was organized by the Zonal Technology Management-Business Planning and Development (ZTM-BPD) Unit, CIFT, Cochin along with Directorate of Fisheries, Govt. of Bihar on 23 March, 2013 at Patna. The objective of the Workshop was to popularize the path breaking technologies developed by CIFT, as well as to scientifically and commercially address the issues faced by the freshwater fisheries sector.

The Workshop was inaugurated by Shri Giriraj Singh, Hon'ble Minister for Animal Husbandry and Fisheries Resources Department, Govt. of Bihar. During his inaugural address, he explained the importance of public-private partnerships for the fisheries sector and a mechanism for an end to end approach for ensuring efficiency in the process of food production to consumption in the country. Dr. B. Meenakumari, Deputy Director General (Fisheries), ICAR, New Delhi and Dr. Mangala Rai, Agriculture Advisor to





Shri Giriraj Singh, Hon'ble Minister, Govt. of Bihar inaugurating the Workshop

Hon'ble Chief Minister, Bihar were the Guests of Honour for the event.

Dr. B. Meenakumari during her address said that the Fisheries Research Institutes under ICAR has got good number of entrepreneur-ready technologies ranging from culture, capture to value addition of fish, which has the potential to attract the industries in India to utilize and exploit the immense investment opportunities available in the sector. She added that the ICAR is working to extend the benefits of its Research Institutions to fuel innovation in global business and to bring benefit to the large section of the society. Dr. Mangala Rai appreciated the initiative taken by ZTM-BPD Unit, CIFT and Directorate of Fisheries, Govt. of Bihar in bringing together the scientific community and industry representatives in a single platform. He urged the participants of the Workshop, to adopt new and innovative production technologies in fisheries and bring out profitable business ventures.

Shri S.S. Sharma, Principal Secretary, Animal and Fisheries Resources Department, Govt. of Bihar welcomed the participants. Dr. T.K. Srinivasa Gopal, Director, CIFT, Cochin presided over the inaugural meeting. Shri Nishat Ahmad, Director of Fisheries, Govt. of Bihar delivered the vote of thanks.

Training on High Pressure Food Processing

CIFT, Cochin organized a National training on "Application of high pressure for food processing" on 12 March, 2013. The training was organized to disseminate the knowledge and achievements gained under the NAIP Sub project "Studies on high pressure processing (HPP) of high value perishable commodities" (Component 4 - Basic and strategic research in the frontier areas of agricultural sciences). The training intended to equip scientists, teachers, students, technologists and entrepreneurs involved in food

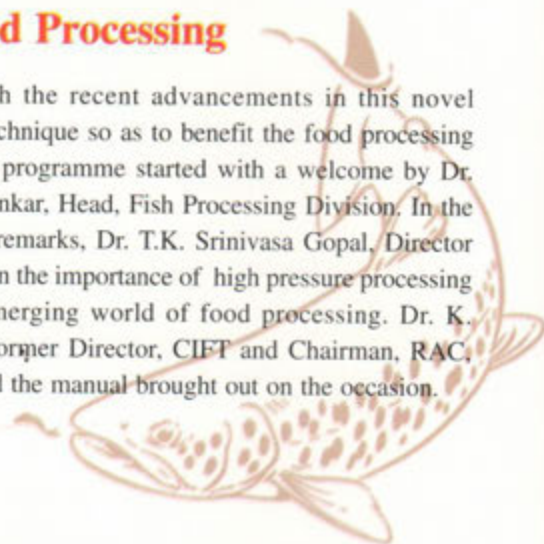


Participants of the Workshop

The Workshop consisted of an exclusive technical conference that featured technical presentations and panel sessions for providing a topical arena for the industry professionals to enhance their technical knowledge, share ideas with scientific community and formulate new business plans. During the technical sessions presentations were made by Shri Nishat Ahmad, Dr. C.N. Ravishankar, Principal Scientist, Dr. George Ninan, Dr. A.A. Zynudheen and Dr. S.K. Panda, Senior Scientists from CIFT, Dr. C.K. Murthy, Executive Director, NFDB, Hyderabad and Shri Nitin Singh, Business Manager, Business Incubation Centre, CIFT. The topics covered were-1) Potential and prospects of freshwater fisheries, 2) Quality assurance in freshwater fish processing, 3) Value added products from freshwater fish, 4) Utilization of fish waste, 5) Initiatives of NFDB to promote entrepreneurship development in freshwater fisheries, 6) Concept of fisheries business incubation, and 7) Business opportunities in freshwater fisheries sector. The session was followed by a demonstration of preparation of various value added products from freshwater fish.

The Workshop witnessed participation of 170 members including Officials of State Fisheries Departments and Entrepreneurs/Industry representatives from seven states viz. Odisha, West Bengal, Jharkhand, Uttar Pradesh, Madhya Pradesh, Chattisgarh and Bihar.

industry with the recent advancements in this novel processing technique so as to benefit the food processing sector. The programme started with a welcome by Dr. C.N. Ravishankar, Head, Fish Processing Division. In the introductory remarks, Dr. T.K. Srinivasa Gopal, Director emphasized on the importance of high pressure processing in today's emerging world of food processing. Dr. K. Devadasan, former Director, CIFT and Chairman, RAC, CIFT released the manual brought out on the occasion.





Release of the Book of abstracts (L to R: Dr. K. Devadasan, former Director, CIFT, Dr. T.K. Srinivasa Gopal, Director, CIFT and Dr. C.N. Ravishankar, HOD, FP)



A section of the participants

The following lectures were delivered in the technical session which followed:

- ◆ High pressure processing of marine products - Dr. J. Bindu, Senior Scientist, CIFT, Cochin
- ◆ High pressure processing of fruits - Dr. P. Srinivas Rao, Associate Professor, IIT, Kharagpur



Practical demonstration in progress

- ◆ High pressure processing of milk and milk products - Dr. Ashish Kumar Singh, Senior Scientist, NDRI, Karnal
- ◆ High pressure processing of meat and meat products - Dr. Suresh K. Devatkal, Senior Scientist, CIPHET, Ludhiana
- ◆ High pressure processing of vegetables - Dr. K.P. Sudheer, Associate Professor, Kelappaji College of Agriculture & Technology, Tavanur

The afternoon session was devoted to practical classes. Dr. J. Bindu, Senior Scientist, Fish Processing was the Convener of the programme. The Co-Conveners were Dr. Sanjoy Das, Senior Scientist, Microbiology, Fermentation & Biotechnology and Dr. K.K. Asha, Senior Scientist, Biochemistry & Nutrition.

Awareness Programme on Value Added Products from Tuna Waste

Under the NAIP project on "A value chain on oceanic tuna fisheries in Lakshadweep sea" an awareness programme on "Value added products from tuna waste" was organized on 26 March, 2013 at the Village Dweep Panchayat (VDP), Minicoy, Lakshadweep islands. About 50 members from various Self Help Groups (SHG) in and around Minicoy attended the programme.

Shri O. Ibrahim Manikfan, Vice Chairperson, VDP delivered the inaugural address. Shri B. Pookunhi Koya, Executive Officer, Shri F.G. Mohammed, Information Officer and Ms M.P. Khadeeja, Grama Sevika, of VDP

spoke during the occasion. Dr. P. Pravin, Principal Scientist, Shri C.T. Nithin and Shri T.R. Ananthanarayanan, Senior Research Fellows, CIFT, Cochin were also present on the occasion.

Awareness on the preparation of various products like liquid smoked masmin, masmin flakes, masmin powder, Tuna Kure, pet food, Silo feed, PUFA from tuna eyes, gelatin from tuna skin, calcium from bone, hydrolysate from tuna processing waste etc. were given to the participants. The participants were given samples of Tuna Kure, liquid smoked masmin, masmin flakes, masmin powder for sensory evaluation and the products were well accepted by them.

Tuna waste is becoming a major issue in Minicoy especially at the canning plants, as they do not have proper technological inputs to convert the red meat, gills, bone, skin, gut etc. into useful value added products and products that can fetch good market value. The participants desired hands-on training at CIFT in the preparation of different value added products from tuna processing waste.



Inaugural session in progress



Workshop on Technology Management for Researchers

The National Academy of Agricultural Research Management (NAARM), Hyderabad and Zonal Technology Management - Business Planning and Development Unit (South Zone), CIFT jointly organized a Workshop on Technology Management for Researchers during 28 February to 6 March, 2013 at Hyderabad. The objective of the workshop was to provide an overview of the key concepts and legal framework of technology management, to develop a practical understanding of technology management principles such as technology marketing, techno-entrepreneurship, new product development, technology product life cycle, and to lay the groundwork for further study in the nuances/intricacies of intellectual property and patents.

The Technical Sessions were organized as six modules under the themes (i) Structuring Knowledge Transfer and Intellectual Property Regime, (ii) Technology Translation, (iii) Technology Parks and Incubation Centres, (iv) Markets, (v) Technology Commercialization, and (vi) Successful models and the way forward. The programme consisted of a blend of presentations, lectures, self-exploration instruments, case analysis, experimental learning and group discussions.

The Guest Faculties of the Workshop were Shri Raju Bhoopathi Raju (Associate Director, Fox Mandal, Hyderabad), Brigadier Ganesham (Coordinator, Honeybee), Dr. A.S. Rao (Founder, Indian Innovators Association), Shri K.V. Iyer (Dean, United World School of Business Hyderabad), Shri Kiran Sharma (Chief Executive Officer, Agribusiness and Innovation Platform, ICRISAT), Shri Jithendra Kumar (Vice President, Life Science Incubator at ICICI Knowledge Park, Hyderabad) and Shri Prabir Misra (General Manager, Financial Services Advisory Group at

Sathguru Management Consultants Pvt. Ltd). As part of experience sharing, invited lectures were given by Prof. E. Vadivel (TNAU, Coimbatore), Dr. P.C. Bargale (CIAE, Bhopal), Dr. C.N. Ravishankar (PI, ZTM-BPD Unit, South Zone, CIFT) and Shri Nitin Singh (Business Manager, ZTM-BPD Unit, South Zone). The Technical Sessions also



Participants of the Workshop on Technology Management

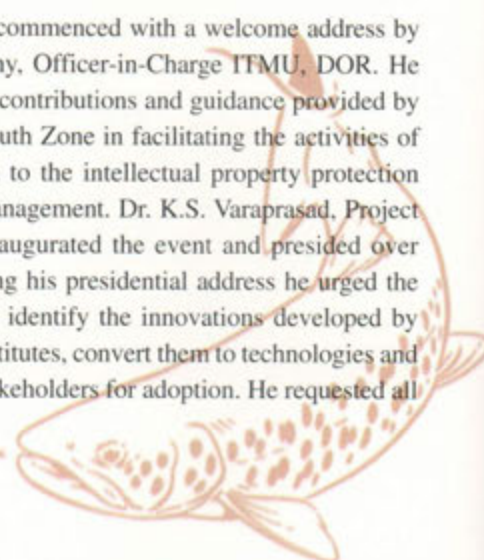
included lectures by in-house faculties of NAARM, Dr. N.H. Rao, Dr. R. Kalpana Sastry, Dr. N. Sandhya Shenoy, Dr. A. Dandapani, Dr. R.Venkattakumar, Dr. N. Sivaramanne and Dr. Manoj P. Samuel.

As part of the Workshops, the participants visited Agri-Incubation Centre, ICRISAT, Hyderabad, Life Science Incubator at ICICI Knowledge Park, Bio-Technology Park, Shamirpet and Poochampally. The Workshop was attended by members of South Zone ITMUs including Scientists, Research Associates and Senior Research Fellows. The programme was sponsored by NAIP-Learning and Capacity Building Project of NAARM and provided an excellent opportunity for mutual interaction and information sharing among the participants.

ZTM-BPD Annual Meeting 2012-13

The Zonal Technology Management - Business Planning and Development Unit (South Zone) organized the Annual Meeting 2012-13 on 7 March, 2013 at Directorate of Oilseeds Research (DOR), Hyderabad. The Meeting was aimed to provide an opportunity for 21 ICAR Research Institutes under South Zone to present their innovations, Institute Technology Management Unit (ITMU) related activities and to deliberate on the issues faced by them in IP management and technology commercialization. The Meeting was attended by Officers-in-Charge and Research Associates of ITMUs.

The meeting commenced with a welcome address by Dr. I.Y.L.N. Murthy, Officer-in-Charge ITMU, DOR. He acknowledged the contributions and guidance provided by the ZTM-BPD, South Zone in facilitating the activities of ITMUs in relation to the intellectual property protection and technology management. Dr. K.S. Varaprasad, Project Director, DOR, inaugurated the event and presided over the Meeting. During his presidential address he urged the ITMU Officials to identify the innovations developed by their respective Institutes, convert them to technologies and handover to the stakeholders for adoption. He requested all





Dr. C.N. Ravishankar delivering the talk

the Institutes to work together in synergy and to assist each other in preparing MoUs/ MoAs, Business Proposals etc.

Dr. C.N. Ravishankar, Principal Investigator, ZTM-BPD Unit, South Zone gave the introductory remarks about the ZTM-BPD initiative of ICAR and explained the objectives of the Annual Meeting. He acknowledged the support and cooperation extended by all member Institutes under the zone, and expressed his gratitude to the Project Director and ITMU Officials of DOR for their willingness and help provided in organizing the Annual Meeting. The inaugural session ended with the vote of thanks proposed by Dr. D. Pati, Member Secretary, ITMU, DOR.

The technical sessions that followed, were chaired by Dr. K.S. Varaprasad and Dr. R. Kalpana Sastry, Principal Scientist & Head, RSM, NAARM, Hyderabad. Dr. I.Y.L.N. Murthy and Shri Nitin Singh, Business Manager, CIFT were the rapporteurs.

During the technical session, Dr. C.N. Ravishankar gave a presentation on the role of ZTM-BPD Unit, South



Session in progress

Zone in Technology Management and Entrepreneurship Development. He also presented the activities and achievements of the ZTM-BPD Unit during the year 2012-13. In the session that followed presentations were made by the ITMU Officers-in-Charge of 21 Member Institutes under the Zone. The Institutes were CIBA, Chennai, CIFT, Cochin, CMFRI, Cochin, CPCRI, Kasaragod, CRIDA, Hyderabad, CTRI, Rajahmundry, CTCRI, Thiruvananthapuram, DOR, Hyderabad, DRR, Hyderabad, IIHR, Bangalore, IISR, Kozhikode, NIANP, Bangalore, NRCB, Thiruchirapalli, DCR, Puttur, DOPR, Pedavegi, NRCM, Hyderabad, DSR, Hyderabad, NBAII, Bangalore, PDADMAS, Bangalore, PDP, Hyderabad and SBI, Coimbatore.

Dr. K.S. Varaprasad gave the concluding remarks of the Meeting by summarizing the proceedings and proposing the recommendations emerged out of the technical sessions. Dr. C.N. Ravishankar proposed the vote of thanks.

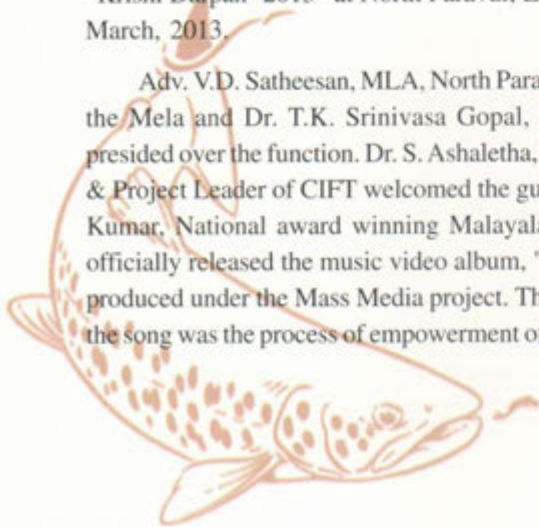
ICAR Window-Showcasing of Agricultural Technologies - "Krishi Darpan-2013"

Under the NAIP sub project, "Mobilizing mass media support for sharing agro-information", CIFT, Cochin organized a one day Technology Expo cum Farmers' Mela "Krishi Darpan -2013" at North Paravur, Ernakulam on 27 March, 2013.

Adv. V.D. Satheesan, MLA, North Paravur inaugurated the Mela and Dr. T.K. Srinivasa Gopal, Director, CIFT presided over the function. Dr. S. Ashaletha, Senior Scientist & Project Leader of CIFT welcomed the guests. Shri Salim Kumar, National award winning Malayalam Cine Artist, officially released the music video album, "Kaanaakkattu", produced under the Mass Media project. The main focus of the song was the process of empowerment of coastal women

taking place in Kerala through technology interventions of another NAIP project, "Responsible harvesting and utilization of selected small pelagic and freshwater fishes". Shri Salim Kumar appreciated the efforts being done under the project for dissemination of technological information to the farmers and addressed the issues and problems of the fish farmers. Smt. Sathyavathy, Deputy Director, Fisheries and Shri V.N. Vijayan, Asst. Manager, Farm Information Bureau offered felicitations. Dr. S Balasubramaniam, HOD, EIS, CIFT proposed vote of thanks.

During the programme, CIFT, NIFPHAT, KVK, MATSYAFED, Kerala State Coastal Area Development Corporation (KSCADC), Society for Assistance to





Adv. V.D. Satheesan inaugurating Krishi Darpan



Shri Salim Kumar releasing the CD



A view of the audience



Panel discussion in progress

Fisherwomen (SAF), Vegetable and Fruit Promotion Council Kerala (VFPCCK), Farm Information Bureau, NGOs and Self-Help Groups who offer technology support for the farming community participated and exhibited their technologies in separate stalls. Value added products commercialized by rural industries under another NAIP project on Pelagic fish value chain of CIFT were also displayed.

The panel discussions arranged for scientist-farmer interaction provided a unique opportunity to the farmers for clarification of their doubts and for the institutions to propagate their technologies and services. The main areas covered in the panel discussion on fisheries and experts were: 1). Needs and measures for conserving fishery - Dr. V.R. Madhu, CIFT, 2). Resources, scope and issues in fish

processing sector - Dr. A. A. Zynudheen, CIFT, 3). Necessity and method for maintaining quality and hygiene - Dr. Femeena Hassan, CIFT, 4). Revolution in fishing crafts and engines - Problems and prospects - Shri M. Nasser, CIFT, and 5) Transfer of new technologies - Means and measures - Dr. S. Ashaletha, CIFT. State level experts on Agriculture, Animal Husbandry and fisheries viz. Shri Vikas, Dr. Smitha, Shri Suresh of Krishi Vigyan Kendra, Njarakkal and Shri Vijayan (Asst. Director of Agriculture) participated in the afternoon session as experts.

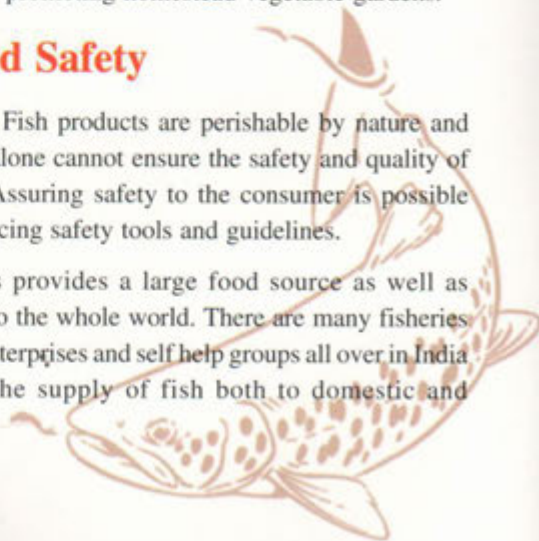
More than 200 farmers attended the exhibition and got benefited by the new technologies in agriculture and new thoughts for improving their business. At the end of the exhibition vegetable seeds and seedlings were distributed to farmers for promoting homestead vegetable gardens.

Stake Holders Meet on Food Safety

Food safety is getting more importance among the consumers and is very important to prevent food borne-illness from mishandled food. Food is an important thing that determines the health of a society or a nation and it is a tool to meet public health goal. Safe food is produced by adhering to good hygienic practice, good manufacturing, good agricultural practice etc. Fish and shellfish are more likely to produce food borne-illness than any other category

of food item. Fish products are perishable by nature and refrigeration alone cannot ensure the safety and quality of the product. Assuring safety to the consumer is possible only by practicing safety tools and guidelines.

Fisheries provides a large food source as well as employment to the whole world. There are many fisheries based microenterprises and self help groups all over in India thriving on the supply of fish both to domestic and





international markets. But as far as food safety is concerned, their knowledge and understanding is very poor. Sensitizing them through scientific interventions is the major objective of the DST supported project entitled "Food safety interventions for women in fishery based microenterprises in coastal Kerala" which is under operation at CIFT, Cochin

As part of the activity of the project, a meeting was organized on 12 February, 2013 for the benefit of the stake holders and local bodies at Valiyaparampa in Kasargod district, which has been identified as one of the places for implementation of the project. The meeting was presided over by Shri V.V. Uthaman, President, Fishermen Welfare Society, Thrikkarippur. Smt. Sandhya Krishnan, Matsyafed Project Officer- luster I welcomed the gathering. Shri K.H. Sherief, Project Officer, Matsyafed offered felicitation. Dr. Femeena Hassan, Senior Scientist, CIFT and PI of the



Dr. Femeena Hassan addressing the gathering

project gave a detailed account of the project. Dr. S. Balasubramaniam, Head, EIS Division, CIFT also spoke on the occasion. Smt. Ajsa Parveen, Senior Research Fellow proposed vote of thanks.

Workshop on Fuel Efficient Fishing

The NAIP Sub project on 'Responsible harvesting and utilization of selected small pelagics and freshwater fishes' under operation at CIFT, Cochin in association with Matsyafed organised a one day Workshop on 'Fuel efficient fishing' at Nattika Co-operative Bank Auditorium in Thriprayar, Thrissur on 6 January, 2013. Shri C.K. Majeed, Vice President, Block Panchayath, Kodungallur inaugurated the Workshop. During the inaugural speech he spoke about the importance of fuel efficient fishing in the



Shri C.K. Majeed delivering the inaugural address

present scenario of the ring seine sector and requested the project team to conduct more awareness programmes and workshops in the coastal belt for the fishing groups. Dr. S. Ashaletha, Co-PI of the project talked about the importance of conservation of fuel in fisheries and the topics of the class. Smt. P. Geetha, District Manager, Matsyafed proposed the vote of thanks.

Later Shri M. Nasser, Principal Scientist, CIFT and Project Co-PI conducted a class on fuel efficient fishing in which he discussed in detail about the problems faced by the ring seiners with respect to fuel expenses, maintenance of propellers etc. Different methods for improving the fuel efficiency and the performance of boats were stressed in the class. During the interactive session, fishermen discussed their problems and cleared their doubts regarding the ring seine fishing operation. A total of 65 fishermen from 36 ring seine boats attended the Workshop. Preliminary data was collected from all the participants. All the 36 boats were registered in "The fuel efficiency improvement programme package" under the project.

Scaling up of Value Chain Based Business Model Programmes

The NAIP sub project, 'Responsible harvesting and utilization of selected small pelagics and freshwater fishes' is handholding with "Fish For All" facility of M.S. Swaminathan Research Foundation, Poompuhar, Tamil Nadu for livelihood enhancement of fishers through implementation of the value chain business models developed under the project. Under this programme, 12 villages in the

Tsunami affected coastal belt of Poompuhar will be included. The following programmes were organised at Poompuhar to have a benchmark assessment of the fishery scenario and living condition of people in the selected villages with reference to proposed technology interventions.



Workshop on Hygienic handling and trading of fresh fish for coastal fisher women

A one day workshop on "Hygienic handling and trading of fresh fish for coastal fisher women" was held on 26 February, 2013. A total of 173 fisherwomen from Poompuhar, Vanagiri and Chinnakudi villages attended the workshop. During the workshop, the existing fresh fish handling and trading methods followed by fisherwoman and its problems, importance and advantages of hygienic handling and trading of fish in dressed and packed form, the business opportunities based on the innovative business model developed under the project etc. were deliberated under different technical sessions. Shri M. Nasser, and Dr. S. Ashaletha, Co-PIs of the project, CIFT took classes. The session was moderated by Dr. L. Krishnan, Head, Fish For All facility. The new fresh fish vending business model was presented to them. The sessions were followed by an interaction session during which the fisherwomen clarified their doubts regarding the new business model proposed. Shri Ganapathy, Community Coordinator and Dr. G.K. Unnithan, MSSRF also participated in the discussions. The fresh fish handling facility at Fish For All facility was also visited after technical session.

Workshop on Hygienic production and marketing of dry fish for coastal women

Women in fishing community of Poompuhar are involved in dry fish making and trading to a great extent for earning their livelihood. But the current practises being followed in fish drying and trading is totally unhealthy. On the other hand, there is very good demand for dry fish among customers. Under the programme envisaged, a one day workshop was organized on "Hygienic production and marketing of dry fish for coastal women" for the coastal women engaged in dry fish trade on 27 February, 2013. During the technical session, problems of unhygienic handling and drying of fish, importance of hygienic Practices, scope of improved business by following hygienic drying and trading, the requirements and ways to improve quality of fish trade etc. were deliberated. The proposed business model on dry fish was presented before them for an interaction. The participants presented the current system of fish drying and trading in the villages and the issues faced by them in the occupation. The improved fish drying facility installed at Fish For All facility was also visited and suggestions were made to improve the drying.

More than 120 women participated from the villages of Puthukkuppam, Nagakarkuppam and Poompuhar in the Workshop. They actively participated in the discussion session and clarified their doubts regarding the new method of dry fish trade proposed. During the technical session, Shri M. Nasser, Principal Scientist, CIFT and Dr. S.



The women involved in dry fish trade being exposed to solar fish drier at Poompuhar



Workshop on Hygienic production and improved fish drying procedures



Interactive session with women in fresh fish trade in progress at Fish For All facility



Discussion with fishery entrepreneurs





Ashaletha, Senior Scientist, CIFT handled the sessions. During interactive session Dr. L. Krishnan, Head of Fish For All Facility, Dr. Muralidharan, Asst. Professor, Annamalai University, Shri Ganapathy, Community Co-ordinator, MSSRF and Dr. G.K. Unnithan, MSSRF also participated in the discussions.

CIFT Designed Solar Fish Dryer at Yanam, Puducherry

As a part of the project of Department of Fisheries and Fishermen Welfare, Puducherry, a wholesale hygienic fish market and solar fish dryer at Savithri Nagar, Yanam constructed by Yanam Municipality was inaugurated by Honorable Chief Minister of Puducherry Shri N. Rangasamy on 6 January, 2013. Solar drier designed under the technical guidance of CIFT has a capacity to process 1000 kg fresh fish. The project was funded by National Fisheries Development Board. Honorable Chief Minister of Puducherry has given special appreciation to CIFT's contribution in installing the solar drier. Shri V. Sabapathy (Honorable Speaker, Puducherry), Shri P. Rajavelu (Honorable Minister for Welfare, Puducherry), Shri N.G. Pannirselvam (Honourable Minister for Local Administration, Puducherry), Shri T. Thiagarajan (Honourable Minister for Electricity, Puducherry), Shri Malladi Krishna Rao (Honourable Member of Legislative Assembly, Yanam),

The workshop was followed by a discussion with a group of interested business entrepreneurs including M/s. Green Diamond International and market supervisors from selected supermarkets in the nearby township. The market prospects and challenges of the new value chain business model proposed for fish products envisaged to be produced and marketed by coastal fisherwomen were discussed in detail.

Smt. M. Sathiavathy (Chief Secretary, Puducherry), Shri W.V.R. Murthy (Secretary, Fisheries, Puducherry), Smt. Monica Bharadwaj (Superintendent of Police, Yanam), Dr. M. Surya Prakash (Chief Executive, NFDB, Hyderabad), Shri V. Balan (Chairman, AFT, Puducherry), Shri N.S.J. Jayabal (Chairman, Pondicherry Engineering College, Puducherry), Shri N. Gnanasekeran (Chairman, PRTC, Puducherry), Shri Viyapuri Manikandan (Chairman, PTDC, Puducherry), Smt. G. Ramalakshmi (Director, Fisheries, Puducherry), Shri S. Ganesan (Regional Administrator, Yanam), Shri A.S.P.S. Ravi Prakash (Director, Local Administration Department, Puducherry) and Shri M. Murugesan (Commissioner, Yanam Municipality) were present in the function. On behalf of CIFT, Dr. M.M. Prasad SIC, Visakhapatnam Research Centre of CIFT, Smt. Arathy Ashok, Scientist and Dr. M. Swamy Kumar, Tech. Officer (T7-8) have attended the function.



Inauguration of whole sale hygienic fish market and solar



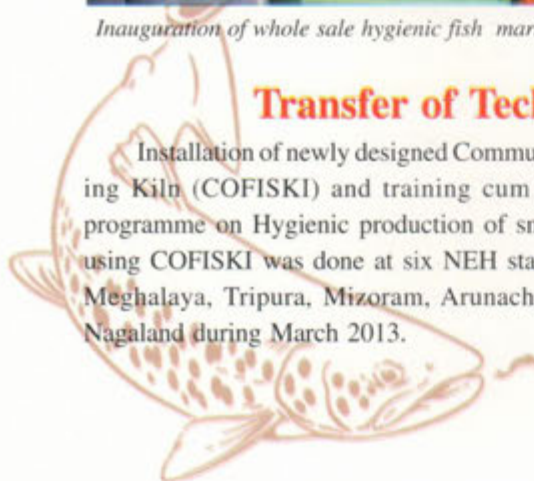
Chief Minister felicitating Dr. M.M. Prasad

Transfer of Technology Programmes at NEH Region

Installation of newly designed Community Fish Smoking Kiln (COFISKI) and training cum demonstration programme on Hygienic production of smoke cured fish using COFISKI was done at six NEH states viz. Sikkim, Meghalaya, Tripura, Mizoram, Arunachal Pradesh and Nagaland during March 2013.

At Sikkim

COFISKI was installed at Krishi Vigyan Kendra, Ranipool in Sikkim on 3 March, 2013 and a training cum demonstration programme on Hygienic production of smoke cured fish using COFISKI was conducted by





Dr. M.M. Prasad, SIC, VRC of CIFT, Visakhapatnam during 3-4 March, 2013.

At Arunachal Pradesh

A training-cum-demonstration on 'Interventions of CIFT technologies' for the benefit of fisherfolk, progressive farmers and women self help group' was conducted by the Visakhapatnam Research Centre of CIFT under the NEH plan at Iduli and Jia villages of Roing, Lower Dibang Valley District, Arunachal Pradesh during 17-19 March, 2013. The training was conducted at one of the progressive fish farmer's farm. Fifty trainees which included tribal fishers, progressive farmers and different women self help group members participated in the programme. The programme was inaugurated by Shri Duym Davi, Fisheries Development Officer, Roing, who also released the pamphlet on 'Fish Pickle' preparation in local language. Dr. R. Raghu Prakash and Dr. L.N. Murthy, Scientists, CIFT, Dr. T.J. Ramesha, Programme Coordinator, Krishi Vigyan Kendra, Roing, Shri Jimmy Mize, Subject Matter Specialist, KVK, Roing, Shri Raju Linggi, progressive farmer of Iduli and Jia Village addressed the gathering during the inaugural session.

The training included sessions on various harvesting methods that could be employed in harvesting resources from the fast flowing rivers, small reservoirs and different farm levels. The trainees till date were aware of only using monofilament gillnets, cast nets and local made bamboo traps for harvesting the resources. Training was given in fabricating simple multifilament gillnets set either at bottom, mid-water or surface. Also they were exposed to fabrication of multi-mesh gill nets using three different mesh size webbings based on the species available in three columns of the reservoir. A few foldable traps were distributed for further use. Training was also imparted on use of troll lines and hook and line for freshwater fishes. Technical information was disseminated to the trainees on various types of baits for use in reservoirs. Inputs such as



Distribution of foldable traps

simple multifilament gill nets (4 Nos.), multifilament multi mesh gill nets (2 Nos.), plastic coated iron meshed foldable traps (10 Nos.), troll lines, hooks and artificial baits were distributed to the trainees.

The training session on 'Value added products' comprised of lectures on different methods of fish processing, different types of value added fish products, hygienic handling of fish and importance of packaging. Practical training was imparted to the tribal fisherfolk and other self help group members on the preparation of fish pickle using freshwater fish, preparation of fish mince employing a meat mincer, preparation of fish pakoda, breaded and battered products and preparation of fish cutlets. Demonstration of fish wafers was performed. Inputs such as, insulated fish bags (4 Nos.), heat sealing machines (2 Nos.), meat mincers (2 Nos.), standup pouches, masks and mouth guards were distributed to the trainees.

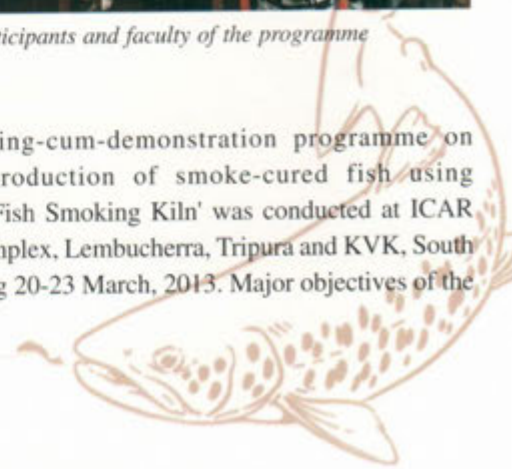
Pamphlets in Arunachal Pradesh local language on the preparation of fish pickle and fish cutlets were prepared and distributed to the trainees. Posters on 'Health benefits of fish' and 'Protocol of smoking kiln' were displayed. During the valedictory session, the trainees gave the feedback. The trainees informed that they were unaware that fish can be converted into so many different value added products and said that they would try their best to utilize the acquired skills for income generation and also requested CIFT to help in setting up of a small plant for hands-on training programme at Roing for the betterment of SHGs. Dr. T.J. Ramesha, Programme Coordinator thanked CIFT for conducting the programme.



Participants and faculty of the programme

At Tripura

A training-cum-demonstration programme on 'Hygienic production of smoke-cured fish using Community Fish Smoking Kiln' was conducted at ICAR Research Complex, Lembucherra, Tripura and KVK, South Tripura during 20-23 March, 2013. Major objectives of the





Participants and faculty of the programme



Demonstration session in progress

programmes were: i). To install two Community Fish Smoking Kiln (COFISKI) units, and ii). To conduct training-cum-demonstration for hygienic production of smoke cured fish using Community Fish Smoking Kiln

The training session comprised of lectures on different methods of fish preservation, health benefits of fish consumption, importance of smoking fish using COFISKI and practical training on hygienic production of smoke cured fish using COFISKI. Kum. Jesmi Debbarma, Scientist, Shri A.K. Panigrahi and Shri K.V.S.S.S.K. Haranath, Technical Officers from Visakhapatnam Research Centre of CIFT were involved in conducting the programme. The programmes were inaugurated by Dr. M. Dutta, Joint Director, ICAR Complex, Lembucherra and Dr. A.K. Singh, Programme Coordinator, KVK, South Tripura. Two COFISKI Units were installed at ICAR complex, Lembucherra and KVK, South Tripura. About 100 fishermen and fisherwomen were benefited from both the programmes.

At Mizoram

A training-cum-demonstration programme on 'Harvest and post harvest technologies' was conducted by the Visakhapatnam Research Centre of CIFT at Krishi Vigyan Kendra (KVK), Lengpui, Mamit District, Mizoram during 26-28 March, 2013.

The programme was conducted by Dr. U. Sreedhar and Dr. B. Madhusudana Rao, Senior Scientists and was assisted by Shri B.K. Panda, Technical Officer. Shri Vanlalhruaia Hnamte, Programme Coordinator, KVK, Lengpui and Shri Md Mintul Ali, SMS (Fishery) helped the team in conducting the programme. Fifty participants from Dinthar, Venglai, Kanan Veng, Model Veng, Vengthar, Venghlui and Lengpui villages attended the programme.

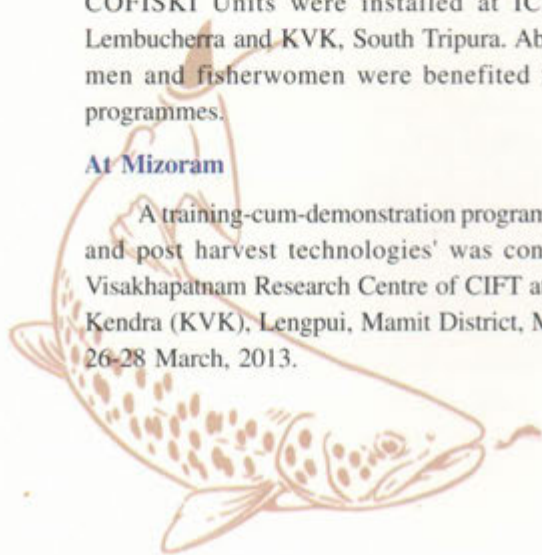
The training session on 'Harvest technologies' included lectures on various harvesting methods that could be employed in Mizoram for harvesting resources from various water bodies. The Mizoram fishermen till date were aware of only using cast nets and hand held scoop nets for harvesting the resources in their water bodies. Hazardous practices such as use of dynamites and fish poisons are also used. An awareness lecture on the hazards of use of dynamites and fish poisons was given to the fishermen. Training was given in fabricating simple multifilament gill nets set either at bottom, mid-water or surface. Also they were exposed to fabrication of multi mesh gill nets using three different mesh size webbings based on the species available in three columns of the water bodies. Till date, the predatory fishes were not being exploited in the water bodies of Mizoram. For this purpose hands-on training was given in fabricating and setting of foldable traps for exploiting these resources. A few foldable traps were



Participants and resource persons at KVK, Lengpui, Mizoram



Distribution of insulated fish bags





distributed for further use. Training was also imparted on use of troll lines and hook and line for freshwater predatory fishes. Information was disseminated to the tribal folk on various types of baits used for freshwater carnivorous and herbivorous fishes. A preliminary discussion was done with the KVK officials and fishermen on the prospects of introducing FRP coracles in the water bodies of Mizoram. Fishermen expressed deep desire to adopt this technology.

The training session on 'Post harvest technologies' comprised of lectures on different methods of fish processing, different types of value added fish products, hygienic handling of fish and importance of packaging. Practical training was imparted on the preparation of fish pickle using freshwater fish, preparation of fish mince employing meat mincer, preparation of fish balls and fish cutlets and preparation of smoked fish. Demonstration of fish wafers was performed. Training was imparted on hygienic packaging of fish pickle and smoked fish.

Technical Discussions with Foreign Nationals

The scientists of the Veraval Research Centre of CIFT participated in a technical discussion with Intertek Moody Marine, Canada and M/s Hindustan Unilever Limited, Gujarat on the 'Sustainability and MSC certification to threadfin breams (*Nemipterus japonicus*)' on 4 February, 2013 at Veraval RC of CIFT.

The scientists of the Centre also participated in another technical discussion on 'Sustainable harvesting and fishery certification of Cephalopods of Gujarat'. Mr. Francesco Palau, Appetais Italia SpA, Italy, Mr. Egidio Machhi, Chief Executive, M&G Trading, Italy and exporters of Gujarat attended the session on 26 February, 2013.



Technical discussion with Intertek Moody Marine, Canada and M/s Hindustan Unilever Limited in progress

Inputs such as simple multifilament multi mesh gill nets (4 Nos.), plastic meshed foldable traps (5 Nos.), troll lines, hooks and artificial baits for better harvesting and inputs such as meat mincers (2 Nos.), heat sealing machines (3 Nos.), insulated fish bags (3 Nos.) and standup pouches of different capacities, aprons, gloves, masks and caps were distributed to the trainees. Posters on the 'Health benefits of fish' and 'Hygienic preparation of smoke curing of fish using Community Fish Smoking Kiln' were displayed.

During the valedictory session, two of the participants viz., Shri Lal Lawmkima and Ms. Sanskhumi gave the feedback on the programmes. The trainees expressed that the training gave them an opportunity to learn many things related to fisheries. They informed that they would try their best to utilize the newly acquired skills for income generation. Shri Vanlalhruaia Hnamte, Programme Co-ordinator thanked CIFT for conducting the programme and extended his support for future collaborative programmes. The training programme was telecasted through Door Darshan Mizoram on 28 March, 2013.



Mr. Francesco Palau, Appetais Italia SpA, Italy, Mr. Egidio Machhi, Chief Executive, M&G Trading, Italy after the discussion

CIFT Signs Consultancy Agreement with CPT

CIFT, Cochin signed a consultancy agreement with Cochin Port Trust for providing technical guidance for setting up of an Effluent Treatment Plant (ETP) at Cochin Fisheries Harbour in connection with the up-gradation of infrastructure. Under the agreement CIFT will be providing engineering drawings with specifications, membrane filter and undertake supervision of construction of the ETP at different stages. The agreement was signed between Shri G.P. Rai, Chief Engineer, Cochin Port Trust and Dr. C.N. Ravishankar, OIC, ITMU, CIFT in the presence of by Dr. T.K. Srinivasa Gopal, Director, CIFT. The project is operated from the Quality Assurance and Management Division of the Institute.





Tribal Sub Plan Programmes Organized

Distribution of FRP Aluminium Boat and Gillnets at Wayanad, Kerala

Under the Tribal Sub Plan, (TSP) a programme for distribution of aluminium boat and gillnets to tribal fishermen was organized by CIFT, Cochin in association with Nellarachal ST Fisheries Cooperatives Society at Karapuzha, Ambalavayal in Wayanad District of Kerala on 27 February, 2013. Dr. Leela Edwin, HOD, Fishing Technology welcomed the gathering and gave an introduction about the TSP of CIFT. Dr. T.K. Srinivasa Gopal, Director, CIFT gave the Key Note address and he also explained briefly about the activities of CIFT. Shri M.V. George, Grama Panchayath President, Ambalavayal, presided over the meeting. Smt. A.S. Vijaya, Block Panchayath President, Batheri was the Chief Guest and she inaugurated the programme by lighting the lamp. She also handed over the aluminium canoe fabricated by CIFT and improved gill nets to the Fisheries Society. In her inaugural address she explained the problems of the fishermen community and requested CIFT for continued support. Shri P. Gopinath, IMC Member, CIFT, Dr. A. Radhama Pillai, Programme Coordinator, KVK, Ambalavayal, Smt. Subaida Gafoor, Ward Member, Nellarachal and Shri A. Sukumaran, Promoter, Tribal Society and Dr. S. Balasubramaniam, HOD, EIS

Division, and Coordinator, TSP programmes offered felicitations. Dr. M.P. Remesan, Principal Scientist, CIFT proposed vote of thanks. About 80 fishermen participated in the programme.

Distribution of FRP Coracles and Gillnets at Kabani, Karnataka

Under the Tribal Sub Plan, a programme for distribution of FRP coracles and gillnets to tribal fishermen was organized by CIFT, Cochin in association with Karnataka State Co-operative Fisheries Federation (KSCFF) at Krishna Raja Sagar, Mysore district, Karnataka on 3 March 2013. The programme venue was shifted to Krishna Raja Sagar due to local election at Kabani. However tribal fishermen of Kabani came to Krishna Raja Sagar Dam venue to receive the fishing implements viz. coracles and gill nets. The programme was presided over by Dr. T.K. Srinivasa Gopal, Director, CIFT. Shri H.S. Veerappa Gowda, Director of Fisheries, Govt. of Karnataka was the Chief Guest. During the programme, 20 improved FRP coracles and improved gillnets developed by CIFT were distributed to the tribal fishermen belonging to the Girijanara Meenugarara Sahakara Sangha affiliated to KSCFF. About 80 fishermen participated in the programme. Shri N. Nanje Gowda, Ex-



Inaugural session in progress



Inaugural session in progress



Aluminium boat in water



FRP coracle in water



Chairman and Director, KSCFF, Mysore and Shri Siddaiah, Project Manager, KSCFF participated as special invitees. Dr. S. Balasubramaniam, HOD, EIS Division, and Coordinator, TSP programmes, Dr. Leela Edwin, HOD, FT Division, Dr. P. Pravin and Dr. Saly N. Thomas, Principal Scientists made arrangements for the programme.

Training programme at Jangareddygudem, A.P.

Three days training cum demonstration programme on Interventions of CIFT Technology was conducted for the benefit tribal fisher-folks of Kotaramachandrapuram of Jangareddygudem, West Godavari, Andhra Pradesh by Visakhapatnam Research Centre of CIFT during 26-28 March, 2013. Fifty fishermen belonging to ST groups from two villages viz. Reddygudem and Lakshmipuram engaged in fishing activities in Kovvada Canal Reservoir of Jangareddygudem were benefitted from the training programme.

Inaugural function of the programme was presided by Dr. M.M. Prasad, SIC of the Centre. The programme was inaugurated by Shri Surya Narayana, Project Officer, Integrated Tribal Development Authority, K.R. Puram. Felicitation was offered by Dr. V.V. Krishna Murthy, Deputy Director of Fisheries, West Godavari District. Dr. G.



Participants and resource persons

Rajeswari, Principal Scientist, CIFT spoke on harvesting methods from impounded waters and the technologies developed hitherto at CIFT for simple and sustainable development of fisheries in the region. Smt. Arathy Ashok, Scientist, CIFT proposed Vote of thanks.

In the programme, different technical sessions on recent trends in fishing technologies for inland sectors and income generation through preparation of value added products were dealt with. Practical demonstration sessions were held on Hygienic handling of fish, Preparation of value added products viz., fish pickles, fish cutlet, fish pakoda and fish wafers, and Employing gillnets and foldable fish traps in reservoir fisheries. The foldable fish traps developed by CIFT were tested in field conditions in Kovvada Reservoir.

The trainees were also distributed with gillnets, foldable fish traps, fish meat mincers, hand-held sealing machines, and Insulated fish bags. On the final day of the training programme, beneficiary feedback was collected and lack of suitable crafts for reservoir fishing was found to be reported as a major constraint in the area. The training programme was conducted in collaboration with Department of Fisheries, West Godavari District, Government of Andhra Pradesh.



Distribution of insulated fish bag

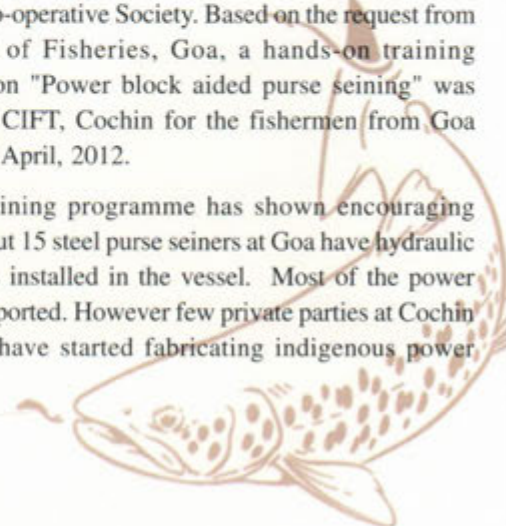
Power Block Aided Purse Seining Getting Popular in Goa

Purse seine operation is highly labour intensive and requires about 25 to 30 crew members on board the fishing vessel for hauling the net and carrying out fishing operations smoothly. The length and depth of the purse seine net has been increasing over time and nowadays purse seine nets of length up to 1500 m with depth of the netting up to 120 m are used.

The hydraulic power block for medium sized purse seiners was introduced for the first time in the country by CIFT at Cochin under an Institute Project during 2011. The power block was installed on board the vessel M.V. Bharat

Darshan, 21.2 m L_{OA}, 193 Hp at Cochin belonging to a Fishermen Co-operative Society. Based on the request from Department of Fisheries, Goa, a hands-on training programme on "Power block aided purse seining" was organized at CIFT, Cochin for the fishermen from Goa during 10-13 April, 2012.

The training programme has shown encouraging results as about 15 steel purse seiners at Goa have hydraulic power blocks installed in the vessel. Most of the power blocks are imported. However few private parties at Cochin and Kanpur have started fabricating indigenous power





Indigenously fabricated power block ready for installation on-board steel trawler

blocks. The cost of full set of power block is approximately ₹ 7 lakhs. With the power block installed in their vessel, the fishermen will be able to operate more number of sets on a single day as the time required for hauling the net will be considerable reduced. The use of power block will substantially reduce the drudgery of the crew on-board. As



Chinese power block installed in purse seiner at Goa

there is acute shortage of skilled crew in purse seiners, the use of power block on-board can reduce the number of crew taken on-board for hauling the net. Many fishermen from Karwar, Bhatkal, Malpe and Mangalore have also evinced keen interest in the power block.

CIFT Participates in 7th Indian Expedition to Southern Ocean

An expedition was conducted to Indian sector of Southern Ocean by National Centre for Antarctic and Ocean Research (NCAOR), Goa on-board FORV Sagar Nidhi to work on the inherent properties of the optically active substances with special reference to phytoplankton size spectra in Southern Ocean. Kum. P. Minu, Research Scholar, INCOIS project has participated in the expedition which started from Chennai on 11 January, 2013. The objective was to study the phytoplankton absorption based on size fraction and effect of optically active substances on it, phytoplankton size spectral algorithm validation for the determination of phytoplankton species in Southern ocean waters, improvement of phytoplankton size spectral algorithms suitable for Southern



Kum. P. Minu on-board Sagar Nidhi

ocean waters and to make an *in situ* bio-optical data base for ocean colour applications in Southern Ocean.

The expedition was for 46 days and covered 20 sampling stations from 40 °S and 56 °S. Water samples were collected from the surface and analysis for various parameters were done. They included phytoplankton and NAP absorption (fractionisation studies), Chlorophyll a (fractionisation studies- macro, micro, nano, pico), Total Particulate Absorption, Coloured Dissolved Organic Matter (CDOM) and Total Suspended Matter concentration. The expedition ended on 28 February, 2013 at Mauritius.

International Training Conducted

An International training programme on "Seafood quality assurance" under Technical colaberation scheme of Colombo Plan Programme was conducted at the Quality Assurance & Mangwement Division at the Headquarters

during 14-26 January, 2013. Smt. Harini Suravandita and Mrs. Pavithra Hasangi Gingaddarange from Department of Fisheries, Sri Lanka attended the training.



Training on HPLC based estimation of biogenic amine



Participants and faculty of TCS Colombo plan training



Field Visits

Field Study on harvest technologies of Mizoram

Dr. U. Sreedhar, Senior Scientist, Visakhapatnam Research Centre of CIFT conducted a field study to understand the various harvest technologies employed in the water bodies of Mizoram. Technology on harvesting methods that could be employed in Mizoram was disseminated.

Field visit to fish drying yards of Yanam, East Godavari, A.P.

As a part of inauguration function of wholesale hygienic fish market and solar fish dryer at Savithri Nagar, Yanam on 6 January, 2013, a field visit was made to fish drying yards and discussions were made with the fisherwomen who are engaged in fish drying activities in the presence of NFDB Chief Executive, Dr. M. Surya Prakash. Major problems observed after the discussion were unhygienic drying of fish, flooding of the drying yard during monsoon season, lack of potable water during summer season, inadequate capacity of solar dryer during the peak catch season and lack of storage facilities. Taking into consideration of the existing situation, proper training on hygienic handling and drying of fish and installation of temporary rack drying facilities were suggested by CIFT. In addition, further follow up studies on the utilization pattern of solar dryer by the fisherwomen and the impact of the technology on their livelihood are also suggested to be undertaken at regular intervals.



Field visit to fish drying yards

Field visit to Kovvada canal reservoir and Yerra Kaluva reservoir, West Godavari, A.P.

Dr. M.M. Prasad SIC, Visakhapatnam, Dr. G. Rajeswari, Principal Scientist and Smt. Arathy Ashok, Scientist made field visits to Kovvada canal reservoir and Yerra Kaluva reservoir as a part of the training cum

demonstration programme at Jangareddygudem, West Godavari, A.P. during 26-28 March 2013. Kovvada canal reservoir has a catchment area of 707 acres and Yerra Kaluva reservoir has a total area of 25000 hectares having a depth of 15-20 meters. State Department of Fisheries is doing regular stocking of Indian Major Carps in the reservoirs. State is imposing a lease amount of ₹ 65000 per year for the fishermen engaged in fishing in Kovvada canal reservoir. Considering the socio-economic status of the fishermen, Integrated Tribal Development Agency is presently bearing the lease amount for the fishermen. Catch often varies between 1 kg to 25 kg and marketing is being done locally with an average price of ₹ 90 per kg. Fishermen in Kovvada canal reservoir and Yerra Kaluva reservoir are mainly depending on crafts made of thermocol and gill nets for fish harvesting. The cost of thermocol crafts varies between ₹ 500 to ₹ 800 and the durability of such crafts are very less. Traditional fishing traps made up of bamboo is also being used for fish capture in Yerra Kaluva reservoir. In order to upgrade the fish harvesting technology practiced in the reservoirs, use of FRP coracles and foldable fish traps are being suggested.



Foldable fish trap in use at Kovvada canal reservoir



Traditional traps used in Yerra Kaluva reservoir





CIFT Participates in the 100th Indian Science Congress - Pride of India Expo

The NAIP sub project, "Responsible harvesting and utilization of selected small pelagics and freshwater fishes" participated in the 100th Indian Science Congress - Pride of India Expo held during 3-7 January, 2013 at Kolkata. ICAR Pavilion won Best Design Award in the Expo. Honourable Prime Minister of India, Dr. Manmohan Singh inaugurated the Science Congress.

The Project was directed by ICAR to participate in the mega expo and "Fish Maid" was one of the identified technology/products for exhibiting the important technological achievements brought about under the project. Accordingly, the 25 value added products developed from marine pelagic and freshwater fishes under the trade mark



Dr. M.S. Swaminathan visiting the ICAR stall



Dignitaries from ICAR visiting the stall

"Fish Maid", the fuel efficient propeller, fuel efficient and safe boat design for the reservoir sector etc. were exhibited. Informative posters on the technologies prepared in a very attractive and interesting manner were displayed in the ICAR pavilion.

The leading research organizations like ICAR, DST, CSIR, DRDO, ICMR were some of the major exhibitors at the Pride of India Exhibition. The Expo provided good opportunity for large corporate houses like Reliance Industries, Tata Group, Jindal Steel Empower Limited, Mayer Biotech and various States like Karnataka, Gujrat, Uttarakhand, Madhya Pradesh, West Bengal etc. to showcase their strengths and their contribution towards nation-building. Various Government departments/ministries like the DST, DAVP, MSMEs, DAE, GSI, NCSM and PSUs like ONGC, BEE, BSNL, IRCTC, etc. showcased their initiatives and contributions. Research fellows in the project interacted with visitors to provide first hand information on the displayed technologies. The Expo witnessed a large attendance of researchers, academicians, industry professionals, students, farmers and members of general public. Many visitors expressed interest in the technologies and the business opportunities. Several dignitaries including Dr. S. Ayyappan, Secretary, DARE and DG, ICAR, Dr. M.S. Swaminathan, Member of Parliament appreciated the project team.

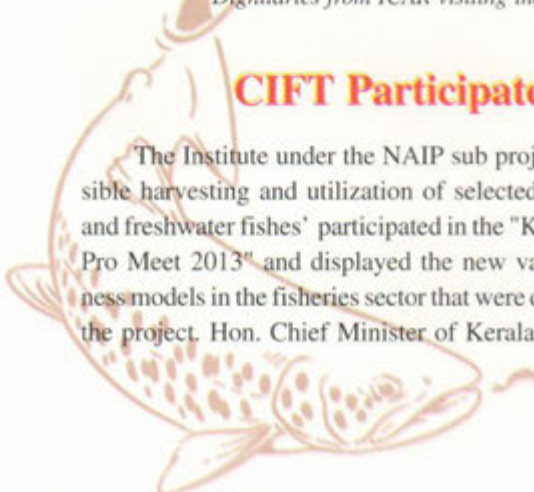


Boat, propeller and Fish Maid products in the ICAR Pavilion

CIFT Participates in Kerala Agri Food Pro Meet 2013

The Institute under the NAIP sub project on 'Responsible harvesting and utilization of selected small pelagics and freshwater fishes' participated in the "Kerala Agri Food Pro Meet 2013" and displayed the new value chain business models in the fisheries sector that were developed under the project. Hon. Chief Minister of Kerala, Shri Oommen

Chandy inaugurated the meet on 17 February. The Meet exclusively for food processing, agriculture and allied sectors was organized by the Department of Industries and Commerce, Government of Kerala at Cochin during 17-21 February, 2013. In the exhibition stall, the value chain business models developed on fresh fish ("Sea Fresh"),





dry fish ("Drish"), value added fish products ("Fish Maid"), Pufa-based poultry products, fish waste-based products etc. were displayed. The fuel saving propeller designs and boat models also attracted visitors' attention.



Visitors at Kerala Agri Food Pro Meet 2013

Awards and Recognitions

Peter Howgate Award to Dr. Jeyakumari

Dr. A. Jeyakumari, Scientist, Fish Processing, CIFT, Cochin was deputed to Thailand to undergo a training programme on "Encapsulation of fish oil" at Kasetsart University, Thailand during 17-21 December, 2012. Dr. Jeyakumari was selected for the 'Peter Howgate Award for Young Fish Technologists-2012', based on merit and her Ph. D. programme. The aim of the award was to support students, technologists and young scientists, to advance their international experience, with a view to developing their career, skills and knowledge in the field of fish technology. The training programme was carried out under the guidance of Dr. Utai Klinkesorn, Assistant Professor, Department of Food Science and Technology, Faculty of Agro-Industry, Kasetsart University, Chatuchak, Bangkok, Thailand.



Dr. Jeyakumari at Kasetsart University

CIFT Comes out with flying colours in ICAR Championships

CIFT, Cochin came out with flying colours at the ICAR Zonal Sport tournament held at SBI, Coimbatore during 18-23 February, 2013. CIFT, Cochin emerged as Winner in Foot ball. Besides, Shri K.V. Mathai became Runner Up in Chess. Smt. V.P. Vijayakumari won Third place in Javelin Throw while Shri K.C. Anish Kumar won Third place in High Jump.



The Captain receiving the Foot ball Championship trophy at Coimbatore



Shri K.V. Mathai receiving the prize

CIFT Becomes Champions in Foot Ball

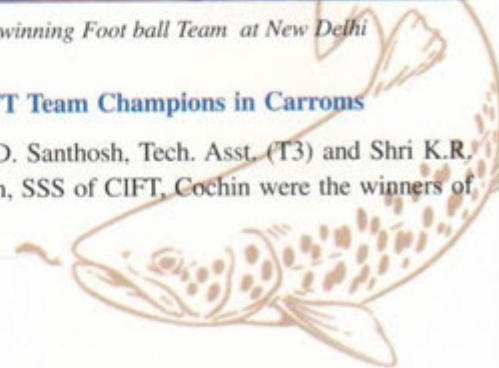
CIFT, Cochin emerged as Runner Up in Foot ball in the ICAR Inter Zonal Sports Tournament held at New Delhi during 18-22 January, 2013.



The winning Foot ball Team at New Delhi

CIFT Team Champions in Carrons

Shri K.D. Santhosh, Tech. Asst. (T3) and Shri K.R. Rajasaranavan, SSS of CIFT, Cochin were the winners of





the Carroms Doubles Tournaments organized by Rainbow Arts & Sports Club, Kadavanthra, Cochin.



Shri Santhosh and Shri Rajasaravanan receiving the trophy

Shri K.D. Santhosh, Tech. Asst. (T3) was the runner up in the Veterans category of 28th Kerala State Carroms Championship held at Thiruvananthapuram during 18-19 February, 2013

Celebrations

International Women's Day

The Institute celebrated International Women's Day on 8 March, 2013. Dr. Mary Matilda, Principal, Maharajas College, Ernakulam was the Chief Guest.



Dr. Mary Matilda giving a lecture on Women empowerment

Invited Talk

During the quarter Dr. R. Jayakumar, Professor, Amrita Centre for Nano Sciences and Molecular Medicines, Cochin gave a talk on "Advances in chitosan based nano materials" at CIFT, Cochin (29 January, 2013).

Radio Talks

The following Radio Talks were delivered by the scientists and technical officers during the quarter:

1. Dr. M.M. Prasad, SIC, Visakhapatnam - Role of marine protected areas in conservation of marine fishery resources (In Telugu), through AIR, Visakhapatnam on 20 February, 2013.
2. Dr. G. Rajeswari, Principal Scientist - Role of bycatch reduction devices in fish conservation (In Telugu),

through AIR, Visakhapatnam on 22 March, 2013.

3. Dr. M.S. Kumar, Tech. Officer (T7-8) - Treated catamarans for the benefit of poor traditional fishermen (In Telugu), through AIR, Visakhapatnam on 29 January, 2013.



Post Graduate Studies

Ph. D. received

Smt. A. Jeyakumari, Scientist, Fish Processing, CIFT, Cochin was awarded Ph. D. degree from CIFE, Mumbai (Deemed University), for her thesis entitled "Studies on delivery of omega-3 fatty acids through emulsification and encapsulation". She worked under the guidance of Dr. G. Venkateshwarlu, Principal Scientist, CIFE, Mumbai.

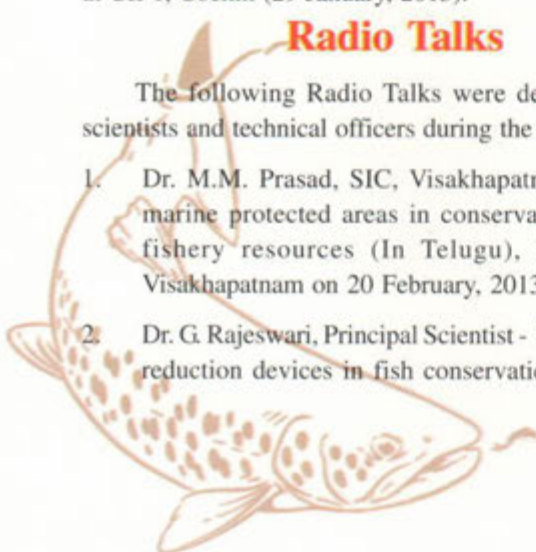


Shri M.S. Kumar, Tech. Officer (T7-8), Visakhapatnam Research Centre of CIFT was awarded Ph. D. degree from Andhra University, Visakhapatnam for his thesis entitled "Studies on biology, biochemistry and trawl codend selectivity of Karut Croacker *Johnius carutta*, Bloch, 1793 off Visakhapatnam coast". He worked under the guidance of Dr. G. Rajeswari, Principal Scientist, RC of CIFT, Visakhapatnam, Prof. K. Sreeramulu and Prof. B. Kishore, Department of Zoology, Andhra University, Visakhapatnam.

New Publications from CIFT

Three necton devices for responsible shrimp trawling' (Hindi and English versions) and 'Trawl designs developed by CIFT for small, medium and large trawlers' were released by Shri K. Babu, Hon. Minister for Port, Excise and Fisheries, Govt. of Kerala on 16 February, 2013 on the occasion of the Launch workshop of the Project on 'Green fishing systems for tropical seas'.

The publication 'Bycatch reduction devices for responsible shrimp trawling' by M.R. Boopendranath, P. Pravin, T.R. Gibinkumar and S. Sabu describes various BRDs which aims at reducing the catch of non-targeted and unwanted species of fish in shrimp trawling. BRDs have been designed and developed taking into consideration the differential size and behaviour pattern of shrimp and fish inside the net. Widespread adoption of BRDs will lead to responsible trawling with significant reduction in bycatch volume and growth, over-fishing, and consequent beneficial





www.ciftr.org

CIFT Technology Advisory Series

विश्वोद्योग प्रथम दुनिया के लिए उपयुक्त कछुओं उपकरण

Dr. P. Pravin, M.P. Remesan, V.R. Madhu, M.R. Boopendranath



2011-2012



Central Institute of Fisheries Technology
Cochin



Bycatch Reduction Devices for Responsible Shrimp Trawling

M.R. Boopendranath, P. Pravin, V.R. Madhu and S. John



2011-2012



CENTRAL INSTITUTE OF FISHERIES TECHNOLOGY
Cochin

impact on the long term sustainability and biodiversity of the marine living resources. BRDs which are most appropriate for the regional fishery conditions need to be adopted and enforced legally, after scientific evaluation and commercial trials, under a co-management regime with stakeholder participation. BRDs, such as Bigeye, Fisheye, Oval grid BRD, Sieve net BRD and the international Smart Gear Competition-2005 (WWF) prize winning Juvenile Fish Excluder cum Shrimp Sorting Device (JFE-SSD), described in this publication have potential to adoption in Indian fisheries and elsewhere in the tropics for reducing bycatch and discards during shrimp trawling. The English publication is priced at ₹150/- and the Hindi publication is priced at ₹100/-

The publication on 'Trawl designs developed at CIFT for small, medium and large trawlers' by P. Pravin, M.P. Remesan, V.R. Madhu and M.R. Boopendranath, is a compilation of all the trawl nets designed and developed by the Institute since its inception. Over the years, the trawls developed by the Institute have incorporated many changes in its structure and design keeping pace with the development of the fishing industry and response to environmental concerns. The book is priced at ₹ 300/-

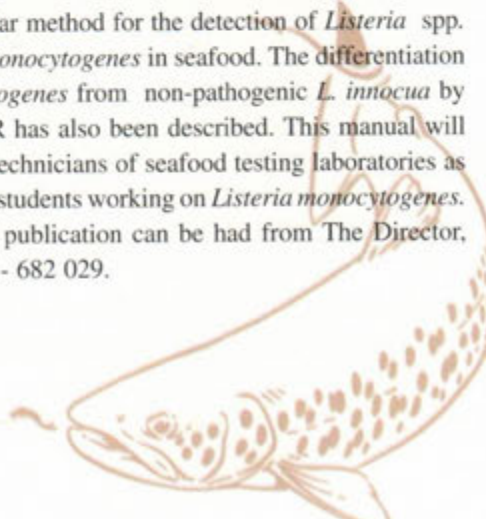


The book 'Fishing craft and gears of Assam' authored by P. Pravin and B. Meenakumari gives an exhaustive account of the fishing craft and gears and methods in the State of Assam. Various fishing craft like the simple rafts, dugout canoes, plank built canoes and FRP canoes, and fishing gears and methods which range from simple hand picking to use of fishing gears made of synthetic materials are classified and covered in the book. It provides the design details of the fishing craft and fishing gears, methods of operation and catch. The book was released by Honorable former President of India Dr. A.P.J. Abdul Kalam on 16 July, 2012 on the occasion of ICAR Foundation Day at New Delhi. The book is priced at ₹ 500/-.



Dr. A.P.J. Abdul Kalam releasing the book

The Laboratory Manual entitled 'Microbiological and molecular methods of detection of *Listeria monocytogenes* in seafood' authored by Sanjoy Das and K.V. Lalitha is another new publication from CIFT, Cochin. CIFT is regularly conducting training programmes on 'Laboratory techniques for microbiological examination of seafood' to the stakeholders. Detection and enumeration of different seafood-borne pathogens is part of the training programme. The current manual has been brought out to meet the needs of knowledge and skills of technicians of seafood exporting plants in detection of *Listeria monocytogenes* from seafood. This manual describes both conventional methods and PCR-based molecular method for the detection of *Listeria* spp. including *L. monocytogenes* in seafood. The differentiation of *L. monocytogenes* from non-pathogenic *L. innocua* by multiplex PCR has also been described. This manual will be useful for technicians of seafood testing laboratories as well as for the students working on *Listeria monocytogenes*. Copies of the publication can be had from The Director, CIFT, Cochin - 682 029.

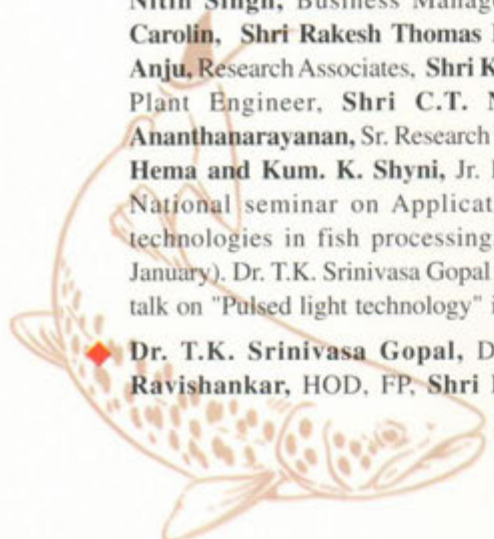




Personnel News

Participation in Seminars/Symposia/Workshops etc.

- ◆ **Dr. T.K. Srinivasa Gopal**, Director - Institute Management Committee Meeting, NRC Meat, Hyderabad (23 January)
- ◆ **Dr. T.K. Srinivasa Gopal**, Director - Training programme on Financial rules for Heads of Departments, ISTM, New Delhi (6-8 February)
- ◆ **Dr. T.K. Srinivasa Gopal**, Director - Meeting of the Directors of ICAR Institutes, ICAR, New Delhi (19-20 March)
- ◆ **Dr. T.K. Srinivasa Gopal**, Director, **Dr. P.T. Lakshmanan**, HOD, B&N, **Dr. Leela Edwin**, HOD, FT, **Dr. K.V. Lalitha**, HOD, MFB, **Dr. T.V. Sankar**, HOD, QAM, **Dr. S. Balasubramaniam**, HOD, EIS, **Dr. C.N. Ravishankar**, HOD, FP, **Dr. M.M. Prasad**, SIC, Visakhapatnam and **Dr. R. Badonia**, SIC, Veraval - Meeting of the Directors and Heads of Divisions of ICAR Institutes, ICAR, New Delhi (15 March)
- ◆ **Dr. T.K. Srinivasa Gopal**, Director, **Dr. P.T. Lakshmanan**, HOD, B&N, **Dr. K.V. Lalitha**, HOD, MFB, **Dr. T.V. Sankar**, HOD, QAM, **Dr. S. Balasubramaniam**, HOD, EIS, **Dr. C.N. Ravishankar**, HOD, FP, **Shri P.K. Vijayan**, **Dr. S. Sanjeev**, **Shri M. Nasser**, **Dr. K. Ashok Kumar**, **Dr. Suseela Mathew**, **Dr. Saly N. Thomas**, Principal Scientists, **Dr. Nikita Gopal**, **Dr. V. Geethalakshmi**, **Dr. S. Ashaletha**, **Dr. A.A. Zynudheen**, **Dr. J. Bindu**, **Dr. George Ninan**, **Dr. J. Charles Jeeva**, **Dr. Rakesh Kumar**, Senior Scientists, **Dr. K.K. Asha**, **Shri C.G. Joshy**, **Dr. A. Jeyakumari**, **Dr. V. Murugadas**, **Dr. P.K. Binsi**, **Kum. Jesmi Debbarma**, **Smt. S.J. Laly**, **Dr. Niladri Sekhar Chatterjee**, Scientists, **Dr. A.R.S. Menon**, Tech. Officer (T9), **Shri C.R. Gokulan**, Tech. Officer (T7-8), **Smt. P.K. Shyma**, **Shri T.V. Bhaskaran**, **Dr. G. Usharani**, **Shri P.S. Babu**, **Smt. K.K. Kala**, **Dr. M. Baiju**, Tech. Officers (T6), **Shri Nitin Singh**, Business Manager, **Dr. Elizabeth Carolin**, **Shri Rakesh Thomas Kurian**, **Smt. K.A. Anju**, Research Associates, **Shri K.K. Santhosh**, Pilot Plant Engineer, **Shri C.T. Nitin**, **Shri T.R. Ananthanarayanan**, Sr. Research Fellows, **Kum. G.S. Hema** and **Kum. K. Shyni**, Jr. Research Fellows - National seminar on Application of emerging technologies in fish processing, CIFT, Cochin (8 January). **Dr. T.K. Srinivasa Gopal** delivered an invited talk on "Pulsed light technology" in the Seminar.
- ◆ **Dr. T.K. Srinivasa Gopal**, Director, **Dr. C.N. Ravishankar**, HOD, FP, **Shri P.K. Vijayan**, **Dr. Suseela Mathew**, Principal Scientists, **Dr. A.A. Zynudheen**, **Dr. George Ninan**, **Dr. J. Bindu**, **Dr. S. Sanjoy Das**, **Dr. S.K. Panda**, Senior Scientists, **Dr. K.K. Asha**, **Shri C.G. Joshy**, **Dr. V. Murugadas**, **Dr. A. Jeyakumari**, **Smt. S.J. Laly**, **Dr. Niladri Sekhar Chatterjee**, Scientists - Training programme on Application of high pressure for food processing, CIFT, Cochin (12 March)
- ◆ **Dr. T.K. Srinivasa Gopal**, Director, **Dr. C.N. Ravishankar**, HOD, FP, **Dr. George Ninan**, **Dr. A.A. Zynudheen**, **Dr. S.K. Panda**, Senior Scientists, **Shri Nitin Singh**, Business Manager and **Shri P. Vineeth Kumar**, Research Associate - National workshop on Business opportunities in freshwater fish, Patna (23 March)
- ◆ **Dr. T.K. Srinivasa Gopal**, Director and **Dr. Nikita Gopal**, Senior Scientist - Result Framework Document (RFD) meeting, ICAR, New Delhi (9 January)
- ◆ **Dr. P.T. Lakshmanan**, HOD, B&N - National seminar on Aquatic Chemistry, CUSAT Cochin (21 March). **Dr. Lakshmanan** delivered a felicitation speech.
- ◆ **Dr. P.T. Lakshmanan**, HOD, B&N - Meeting of Council for Food Research and Development, Konni at Cochin (26 March)
- ◆ **Dr. Leela Edwin**, HOD, FT - National seminar on Law and policy on fisheries conservation management: Issues and challenges, NUALS, Cochin (5 March). **Dr. Leela Edwin** also presented a paper on, "FAO CCRF-Article: Fishing operations - R&D inputs for law and policy for regional fisheries management" in the Seminar.
- ◆ **Dr. Leela Edwin**, HOD, FT, **Dr. P. Pravin**, **Dr. Saly N. Thomas**, **Dr. M.P. Remesan**, Principal Scientists, **Dr. P. Muhamed Ashraf**, **Shri M.V. Baiju**, Senior Scientists, **Dr. V.R. Madhu** and **Dr. K.K. Prajith**, Scientists - National stakeholder's workshop on Energy saving in fishing vessels, CIFT, Cochin (18 January)
- ◆ **Dr. K.V. Lalitha**, HOD, MFB - 5th Annual workshop-2013 of NAIP Component II, New Delhi (11-12 March)
- ◆ **Dr. C.N. Ravishankar**, HOD, FP - First meeting of consortia partners for development of digital knowledge management platform for fisheries, ICAR, New Delhi (21 March)
- ◆ **Dr. C.N. Ravishankar**, HOD, FP, **Dr. B. Madhusudana Rao**, Senior Scientist, **Shri Nitin Singh**, Business Manager, **Shri P. Vineeth Kumar**,





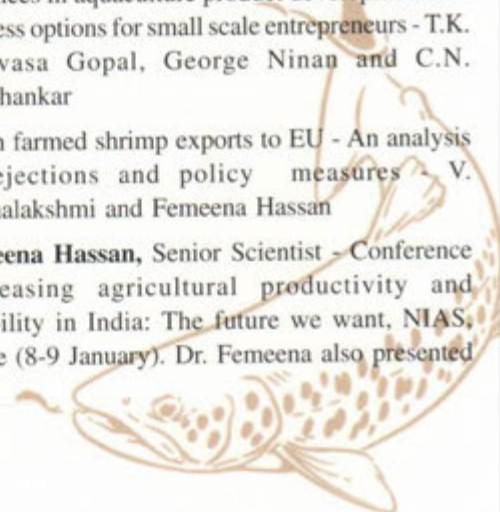
Smt. A. Razia Mohamed, Smt. K.A. Anju and Shri M. Kiran Das, Research Associates - Workshop on Technology management for researchers, NAARM, Hyderabad (28 February - 6 March)

- ◆ **Dr. C.N. Ravishankar**, HOD, FP, **Dr. B. Madhusudana Rao**, Senior Scientist and **Shri Nitin Singh**, Business Manager - ZTM-BPD Annual Meeting, DOR, Hyderabad (7 March)
- ◆ **Dr. C.N. Ravishankar**, HOD, FP and **Dr. C.O. Mohan**, Scientist - Technical scrutiny committee meeting of Ministry of Food Processing Project on Laboratory upgradation for Veraval Research Centre of CIFT, New Delhi (22 January)
- ◆ **Dr. M.M. Prasad**, SIC, Visakhapatnam, **Dr. R. Raghu Prakash**, Senior Scientist and **Shri K.V.S.S.S.K. Harnath**, Tech. Officer (T6) - Agricultural Science Congress, OUAT, Bhubaneswar (5-6 February)
- ◆ **Dr. R. Badonia**, SIC, Veraval - Scientific advisory committee meetings of KVK, Ambuja Cement Foundation, Kodinar (13 & 22 February)
- ◆ **Dr. R. Badonia**, SIC, Veraval, **Dr. C.O. Mohan**, Scientist and **Shri S.B. Purohit**, Asst. - Town Official Language Implementation Committee meeting, Veraval (20 February)
- ◆ **Dr. S. Vishnuvinayagam**, SIC, Mumbai - One day training programme on HI 9828 Multi parameter, Navi Mumbai (29 March)
- ◆ **Dr. S. Vishnuvinayagam**, SIC, Mumbai, **Dr. P.K. Binsi** and **Smt. P. Viji**, Scientists - Workshop organized as part of Global Konkani Festival 2013, Goregaon, Mumbai (4-7 January). Dr. Binsi also delivered an invited talk on "Innovative technologies in fish processing sector" in the Workshop.
- ◆ **Dr. S. Vishnuvinayagam**, SIC, Mumbai, **Dr. P.K. Binsi** and **Smt. P. Viji**, Scientists - First annual regional convention on Sustainable agriculture and food security: Challenges and opportunities in agriculture, animal husbandry and fisheries, CIFE, Mumbai (18-19 January). Dr. Binsi also delivered an invited talk on "Sustainable and innovative post harvest technologies for the fishery resources of Maharashtra coast" in the Symposium.



Dr. P.K. Binsi delivering the talk

- ◆ **Dr. G. Rajeswari**, Principal Scientist - Training programme on Recent trends in aquaculture, SV University, Kakinada (6 March) (As resource person). Dr. Rajeswari also gave a lecture on "Recent trends in fishing technology".
- ◆ **Dr. K. Ashok Kumar**, Principal Scientist and **Dr. S.K. Panda**, Senior Scientist - Draft committee meeting on formulation of ISO standard on traceability for farmed crustacean, captured crustacean, farmed mollusk and captured mollusk, NIPHATT, Cochin (18 January)
- ◆ **Dr. Suseela Mathew**, Principal Scientist - Pre-processing centre subsidy committee meeting, MPEDA, Cochin, (27 February)
- ◆ **Dr. Saly N. Thomas**, Principal Scientist - 17th meeting of Textile Division Council, TXDC, BIS, New Delhi (16 January)
- ◆ **Dr. Saly N. Thomas**, Principal Scientist - Third Public sitting of expert committee on scientific study of fishery wealth, Kozhikode (5 February)
- ◆ **Dr. P. Pravin**, Principal Scientist - Meeting of Trawl ban committee, CMFRI, Cochin (15 January)
- ◆ **Dr. P. Pravin**, Principal Scientist - 2nd Public meeting on trawl ban as expert committee member on scientific study of fish wealth, Cochin (21 January)
- ◆ **Dr. G.K. Sivaraman**, Senior Scientist and **Dr. C.O. Mohan**, Scientist - Training programme on Food safety and certification, EIA, Veraval (19 March) (As resource persons). The following lectures were also delivered by them:
 - i. Microbiological hazards in sea food - Dr. G.K. Sivaraman
 - ii. Quality standards for seafoods - Dr. C.O. Mohan
- ◆ **Dr. George Ninan** and **Dr. V. Geethalakshmi**, Senior Scientists - PAF Congress on Public-private partnership in aquaculture and culture-based fisheries, CIFRI, Barrackpore (9-11 February). The following papers were also presented by them in the Conference:
 - i. Advances in aquaculture product development and business options for small scale entrepreneurs - T.K. Srinivasa Gopal, George Ninan and C.N. Ravishankar
 - ii. Indian farmed shrimp exports to EU - An analysis of rejections and policy measures - V. Geethalakshmi and Femeena Hassan
- ◆ **Dr. Femeena Hassan**, Senior Scientist - Conference on Increasing agricultural productivity and sustainability in India: The future we want, NIAS, Bangalore (8-9 January). Dr. Femeena also presented





a poster entitled, "Empowerment of women: Experiences of oyster cultures and value addition in Kerala" by Femeena Hassan, Saleena Mathew and J. Charles Jeeva in the Conference. The presentation received the Best Poster Presentation Award.

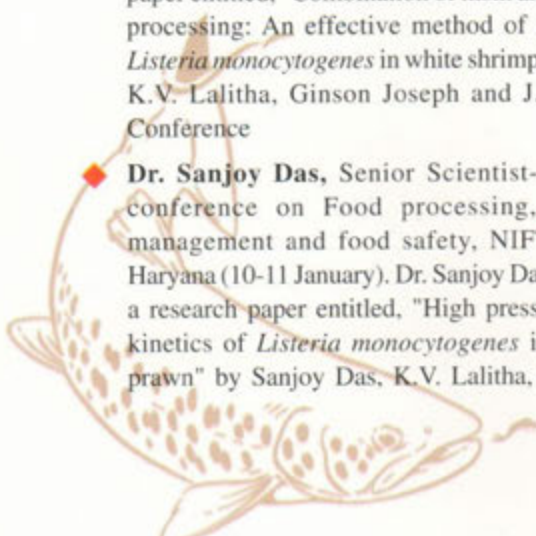


Dr. Femeena Hassan receiving the Award

- ◆ **Dr. R. Anandan, Dr. A.A. Zynudheen and Dr. S.K. Panda**, Senior Scientists - International conference on Indo-European Food for health - 2013, IIT Madras, Chennai (10-12 February)
- ◆ **Dr. R. Anandan**, Senior Scientist - Symposium on Environment and health management for sustainable animal and fish production, Kolkata (5-8 January). Dr. Anandan also delivered a lecture on "Seafood and human health" in the Symposium
- ◆ **Dr. R. Anandan**, Senior Scientist - National conference on Advances in the management and prevention of clinical disorders due to malnutrition, Rajah Serofji Govt. College, Thanjavur (7-8 February) (As resource person)
- ◆ **Dr. R. Anandan**, Senior Scientist - National seminar on Biochemistry in health and environment, St. Joseph's College of Arts & Science, Cuddalore (9 March)
- ◆ **Dr. Sanjoy Das**, Senior Scientist - 3rd International conference on Food technology, IICPT, Thanjavur (4-5 January). Dr. Sanjoy Das also presented a research paper entitled, "Combination of nisin and high pressure processing: An effective method of inactivation of *Listeria monocytogenes* in white shrimp by Sanjoy Das, K.V. Lalitha, Ginson Joseph and J. Bindu in the Conference
- ◆ **Dr. Sanjoy Das**, Senior Scientist- International conference on Food processing, value chain management and food safety, NIFTEM, Kundli, Haryana (10-11 January). Dr. Sanjoy Das also presented a research paper entitled, "High pressure destruction kinetics of *Listeria monocytogenes* in Indian white prawn" by Sanjoy Das, K.V. Lalitha, Ginson Joseph

and J. Bindu in the Conference

- ◆ **Dr. Sanjoy Das, Dr. J. Bindu** Senior Scientists and **Dr. K.K. Asha**, Scientist - Workshop on High pressure processing of high value perishable commodities, IIT, Kharagpur (22 March). They also delivered the following invited talks on the Workshop:
 - i. Microbiological aspects of high pressure processed seafood - Dr. Sanjoy Das
 - ii. High pressure processing of aquatic products - Dr. J. Bindu
 - iii. Effect of high pressure processing on enzymes and nutritional quality of seafood - Dr. K.K. Asha
- ◆ **Dr. P. Muhamed Ashraf**, Senior Scientist - India Israel meeting on materials and nano sciences, MG University, Kottayam (31 January & 1 February). Dr. Ashraf also presented the poster entitled, "Nano metre sized samarium oxide-incorporated aluminium and its resistance to corrosion in marine environment" by P. Muhamed Ashraf and Saly N. Thomas
- ◆ **Dr. P. Muhamed Ashraf**, Senior Scientist - Indo-UK Workshop on Marine primary production, KUFOS, Cochin (12-15 March)
- ◆ **Dr. P. Muhamed Ashraf**, Senior Scientist and **Dr. Niladri Sekhar Chatterjee**, Scientist - Chemist Conclave - Brain Storming Session of Chemists, IARI, New Delhi (14-15 January)
- ◆ **Dr. J. Bindu**, Senior Scientist - National workshop on the NAIP Component-4, New Delhi (25-26 March)
- ◆ **Dr. U. Sreedhar**, Senior Scientist - INCOIS Third user interaction workshop, Hyderabad (8 March) (As resource person)
- ◆ **Shri M.V. Baiju**, Senior Scientist - National strategic workshop on Small scale fisheries, BOBP, Chennai (10-11 January)
- ◆ **Shri M.V. Baiju**, Senior Scientist - Meeting of the Expert committee constituted for installing insulated fish hold on-board fishing vessels, MPEDA, Cochin (26 March)
- ◆ **Dr. Toms C. Joseph**, Senior Scientist - National seminar on Health and environment, Cochin (18 January). Dr. Toms delivered an invited talk on "Marine bioactive compounds" in the Seminar.
- ◆ **Dr. Toms C. Joseph and Dr. B. Madhusudana Rao**, Senior Scientists - International symposium on Genomics in aquaculture, CIFA, Bhubaneswar (22-23 January). Dr. Toms also presented an invited paper on "Mining genomics for novel catalysts" at the Seminar.



- ◆ **Dr. B. Madhusudana Rao**, Senior Scientist - The annual review workshop of Component-I of NAIP, NAARM, Hyderabad (22-23 March)
- ◆ **Dr. Toms C. Joseph**, Senior Scientist and **Shri V.N. Sreejith**, Jr. Tech. Asst. (T1) - Real time PCR training, M/s Invitrogen Bioservices India Pvt. Ltd., Bangalore (13-15 February)
- ◆ **Shri V. Radhakrishnan Nair**, Scientist - Workshop on GIS application on natural resource management, NAARM, Hyderabad (20-23 February). Shri Radhakrishnan Nair also presented a paper titled, "3-D visualization of reservoir and its applications in fisheries - A GIS perspective" in the Workshop.
- ◆ **Dr. V.R. Madhu**, Scientist - Meeting of the expert committee for finalizing the technical bid for purchase of VHF and Echo sounder for mechanized fishing boats for KSCADC, Cochin (6 February)
- ◆ **Dr. C.O. Mohan**, Scientist - National workshop on Foresight and future pathways of agricultural research through youth in India, ICAR, New Delhi (1-2 March)
- ◆ **Shri A.K. Jha**, Scientist - Training on Fabrication of square mesh net, Vanakbara and Veraval (22 February, 11 March & 22 March (As resource person)
- ◆ **Shri C.G. Joshy**, Scientist - Lead auditor training programme on Quality management systems, Southern Campus of NDRI, Bangalore (21-25 January)
- ◆ **Shri V. Chandraskar**, Scientist - Training workshop on Scientific report writing and presentation, NAARM, Hyderabad (4-7 March)
- ◆ **Smt. V. Renuka** and **Dr. A. Jeyakumari**, Scientists - Training programme on Responsible harvest and quality standards for seafood export, CIFE, Mumbai (9-29 January)
- ◆ **Shri Ankur Nagori**, Scientist, **Shri C.R. Gokulan**, Tech. Officer (T7-8) and **Smt. P.K. Shyma**, Tech. Officer (T6) - Business meet on Solar PV, Cochin (7 February)
- ◆ **Dr. A.R.S. Menon**, Tech. Officer (T9) - Brainstorming session on Business opportunities in Life Sciences, KCCI, Cochin (14 January)
- ◆ **Dr. A.R.S. Menon**, Tech. Officer (T9) - Inter Media Publicity Coordination Committee Meeting (Ministry of Information and Broadcasting), Doordarshan Kendra, Thiruvananthapuram (1 March)
- ◆ **Dr. M.S. Kumar**, Tech. Officer (T7-8) - Farm and Home Rural Unit Programme Subcommittee Meeting, AIR, Visakhapatnam (20 February)
- ◆ **Dr. Santhosh Alex**, Tech. Officer (T6) - International Hindi seminar on 'Tulanatmak Sahitya Mein Samajik Nyay', Andhra University, Visakhapatnam (29-31 January)
- ◆ **Dr. Santhosh Alex**, Tech. Officer (T6) - Official language seminar, HPCL, Visakhapatnam (3 March). Dr. Santhosh Alex also presented a paper on "Rajbhasha samasyaeyim aur samadhan" in the Seminar
- ◆ **Shri K.S. Sreekumaran** and **Shri P.P. Anil Kumar**, AF&ACO's - Zonal Workshop on for Financial Officers of South Zone, NAINP, Bangalore (11 January)

Personalia

Promotions

1. Dr. T.V. Sankar, Senior Scientist, Cochin as Principal Scientist
2. Dr. Saly N. Thomas, Senior Scientist, Cochin as Principal Scientist
3. Dr. P. Pravin, Senior Scientist, Cochin as Principal Scientist
4. Dr. M.P. Ramesan, Senior Scientist, Cochin as Principal Scientist
5. Dr. J. Charles Jeeva, Scientist, Senior Scale, Cochin as Senior Scientist
6. Dr. Rakesh Kumar, Scientist, Senior Scale, Cochin as Senior Scientist
7. Dr. S.K. Panda, Scientist, Senior Scale, Cochin as Senior Scientist
8. Smt. A.R. Raji, UDC, Cochin as Asst.

Transfers

1. Shri Amit Vengraj, LDC, Cochin to Visakhapatnam

Retirements

1. Dr. R. Chakrabarti, Principal Scientist & SIC, Mumbai
2. Shri D. Padmanabhan, Tech. Officer (T5), Cochin
3. Shri P.S. Raman Nampoothiri, Tech. Officer (T5) (Voluntary Retirement)